Network Referrals and Self-presentation in the High-Tech Labor Market

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Abstract

The practice of recruiting job candidates sourced through social contacts (i.e., referrals) is pervasive in the labor market. One reason employers prefer to recruit through referrals is that these candidates often present resumes that are perceived to be a better fit for the role. While existing research attributes this pattern to how individuals who make referrals (i.e., referrers) select individuals to refer, we propose a new mechanism: differences in self-presentation. We argue that referral ties increase the candidates' propensity to engage in self-presentation work, motivating and assisting candidates in presenting their backgrounds to convey fit. We examine this claim by utilizing unique data from an applicant tracking system containing job applications to positions at U.S.-based high-tech firms between 2008 and 2012. A candidate-fixed effects specification reveals that when a candidate applies to a firm via a referral, they tend to showcase a rendition of their career history that better matches the target job than when they pursue positions without such ties. Several mechanism checks, combined with supplementary survey evidence, further indicate that the presence of referral ties to the target firm is associated with greater motivation to engage in self-presentation work as well as the provision of different forms of assistance in that work.

Network Referrals and Self-presentation in the High-Tech Labor Market

Social networks play a pivotal role in matching firms and job seekers in the labor market (Granovetter, 1995; Loury, 2006). Indeed, referrals from firm employees and other network contacts stand out as one of the most prevalent recruitment sources for firms (Burks et al. 2015; Smart and Street 2008), and employers frequently prefer referral candidates during screening (e.g., Fernandez and Campero 2017, Fernandez et al. 2000, Fernandez and Galperin 2014, Fernandez and Weinberg 1997, Petersen et al. 2000). Numerous factors account for these tendencies, including referral candidates' superior fit for the target position based on dimensions observed at application (Fernandez et al., 2000; Fernandez and Weinberg 1997), as well as dimensions revealed post-hire (e.g., Burks et al., 2015; Castilla, 2005). In short, employers are more inclined to recruit referral candidates partly due to their application profiles displaying a better fit (Fernandez et al. 2000).

In explaining the superior fit of referral candidates, most research has focused on the process through which individuals making referrals (i.e., "referrers") select candidates. For example, a frequent argument has been that referrers select well-suited candidates due to concerns about their own reputation (Rees 1966, Rees and Shultz 1970, Saloner 1985, Ullman 1966, Smith 2005). However, an emerging line of work casts doubt on whether referrers' selection alone can account for the superior fit of referral candidates. First, referrers' motivation to maintain their reputation competes with other motives influencing whether and who to refer. For example, referrers are sometimes inclined to assist friends in need, and these prosocial motives may compromise the desire to select on quality or fit (e.g., Bian and Huang 2015, Granovetter 1973, Kim and Fernandez 2017, Marsden and Campbell 2012; Bond and Fernandez, 2019). Second, the provision of pecuniary benefits, such as referral bonuses, can conflict with referrers' motivation to pre-screen their referrals on job fit (Beaman and Magruder 2012, Bond et al. 2018). As one recruiter interviewed by Fernandez et al. (2000: 1333) noted, "I know people who would refer their dog if they can get a $250 bonus." Yet, if referrers do not consistently select well-fitting candidates, what accounts for the tendency of referral candidates to present profiles (e.g., resumes, job applications) that prospective employers perceive as a superior fit?

To resolve this puzzle, we propose that employers' perceptions of candidates' suitability at the job application stage depend not only on candidates' objective qualities but also on the work candidates do to present themselves favorably to prospective employers. Emerging research shows that job seekers strategically engage in self-presentation, modifying and customizing the presentation of their background and credentials to increase their hiring chances (He and Kang 2021, Kang et al. 2016, Ng and Leung 2019, Rivera 2012, Schlenker 2012). Building on this recent evidence, we propose that referral candidates will present profiles that are more suitable "on paper" due to their deliberate self-presentation strategies. Our theoretical framework first relates better-fitting profiles to higher interview chances, given that employers are generally attuned to signals at the application stage (Spence, 1978; Kacperczyk and Younkin, 2022), particularly signals indicating person-job/organization fit (Caldwell and O'Reilly 1990; Edwards 1991; Sekiguchi and Huber, 2011). Furthermore, we posit that candidates can amplify the prominence of such signals in their job application materials by engaging in strategic self-presentation work. Despite these benefits of tailoring one's profile to signal fit, the motivation and ability to tailor may often be lacking, preventing the broader adoption of these self-presentation strategies among job candidates. Thus, and most importantly, we theorize that referral ties help alleviate such hurdles, by increasing candidates' motivation and willingness to adapt their profile to the target position and by providing them with assistance in this process.

Evaluating our arguments is empirically challenging. First, it requires a setting in which variations in candidates' self-presentation across prospective employers can be observed—for example, by enabling researchers to identify different versions of a candidate's background presented to different prospective employers. Second, it is also necessary to address the possibility that candidates who apply through referrals may differ from others, perhaps in ways associated with their objective fit for the positions pursued. We address these empirical challenges by taking advantage of unique and extensive data sourced from a job-applicant tracking system that candidates use to apply for jobs in the U.S. high-tech industry. This setting allows us to observe candidates submitting applications to multiple employers, and to identify the versions of candidates' career histories presented to each employer. Importantly, we

observe candidates who reach some employers through referrals and others without such ties, enabling us to investigate the impact of a referral tie on a candidate's propensity to present a better fitting resume (Obukhova and Lan 2013; Fernandez and Galperin 2014). We estimate individual fixed-effect specifications to examine whether signals of person-job/organization fit on a candidate's resume are associated with the presence of referral ties and how such signals affect candidates' odds of advancing in the hiring process. We further conduct several mechanism checks and supplement our findings with survey evidence to unpack the mechanisms through which referral ties influence candidates' self-presentation.

We find support for our predictions. First, our findings validate the premise that profiles with enhanced fit signals along dimensions relevant to employers are associated with better hiring outcomes. Second, as predicted, referral ties are associated with candidates presenting resume versions that are more suitable along these same fit dimensions. Finally, our mechanism checks and survey evidence indicate that referral ties are associated with greater motivation to present a tailored resume as well as with receiving different forms of assistance from referrers. Taken together, these findings shed new light on the benefits of referral networks for job seekers in the labor market. Whereas extant research on networks and labor markets has predominantly centered on the flow of information about job leads through connectors and on connectors' influence on hiring agents on behalf of job seekers (Bian 1997, Granovetter 1973, 1995, Lin et al. 1981, Marsden and Gorman 2001, Mouw 2003, Yakubovic 2005), our study shifts attention to the other side of the triadic relationship: the influence of connectors on job seekers. We thus extend this emerging line of work (e.g., Sterling 2014, Barbulescu 2015), proposing that network connections between firms and job seekers increase the likelihood of successful employment matches by influencing candidates' job-search behavior. More specifically, our study is the first to document that referral ties affect job seekers' self-presentation, enhancing their hiring prospects.

THEORY

Referrals and Job Candidate Fit on "Paper" Credentials

Given the widespread use of referral-based hiring and the importance of hiring outcomes for economic inequality, extensive research has focused on the mechanisms that explain employers' preference for recruitment through referrals (e.g., Fernandez et al. 2000; Yakubovic and Lup 2006; Fernandez and Galperin 2014). A recurring finding is that those with social ties to the target employer are a better fit with the target job on dimensions observable at application (e.g., Fernandez et al. 2000; Fernandez and Weinberg 1997). Referral candidates have also been found to display better fit on dimensions revealed post-hire (Burks et al., 2015; Brown et al., 2016; Castilla, 2005), leading employers to often interpret the presence of a referral itself as a signal of fit (Fernandez and Greenberg 2013). With respect to referral candidates' superior fit on observable dimension at application, for example, Fernandez and Weinberg's (1997) study of hiring at a retail bank found that referral candidates reported stronger computer and language skills, less nonbanking experience, and more bank-related experience than other candidates. Referrals also reported educational credentials that aligned more closely with the requirements of the target job. Subsequent studies replicated this empirical pattern, with Fernandez et al. (2000) documenting that referral candidates were more likely to report being employed at the time of application, reported longer tenure with their previous employer, and had fewer jobs in the past. The authors interpreted these differences as evidence that referrals presented more suitable profiles as job applicants.

Despite this ample research, however, the mechanisms underlying the suitability of referral candidates remain less well-understood. In examining the factors that explain the superior fit of referral candidates, scholars have devoted disproportionate attention to how referrers decide whether and who to refer. A frequent argument has been that current employees, who presumably satisfy the job requirements themselves, often refer individuals who possess similar qualities. In essence, the chances that referral candidates will fit the job demands increase due to the homophily principle (Mouw 2003, Myers and Shultz 1951, Rees and Shultz 1970, Ullman 1966). Second, the selection of referrals is thought to be influenced by referrers' reputation concerns. For example, referrers might be inclined to favor qualified

candidates, anticipating that the referred candidate's fit will affect their own reputation in the target firm (Rees 1966, Rees and Shultz 1970, Saloner 1985, Ullman 1966, Smith 2005).

Although the selection explanation presented in prior research has undeniable merits, recent studies cast doubt about whether selection alone accounts for the superior fit of referral job candidates. First, the well-established homophily argument is predicated on the fact that employee referrers fit the firm's hiring requirements and therefore are likely to be connected to and refer suitable candidates. Yet, research has documented significant variation in the quality and fit of candidates recruited through employee referrals, partly stemming from differences in the quality of the employees making referrals (Bearman and Magruder 2012, Yakubovic and Lup 2006). In addition, referrers' motivation to protect their reputation in the hiring firm can conflict with other motives for making referrals. For example, individuals might be motivated to assist friends and network contacts in need, regardless of their suitability for the target job (Bian and Huang 2015, Granovetter 1983, Kim and Fernandez 2017, Marsden and Campbell 2012, Bond and Fernandez 2019). Finally, employers often offer referral bonuses and other pecuniary inducements to encourage referrals from their employees and other network contacts (Beaman and Magruder 2012, Bond et al. 2018). These pecuniary inducements, if sufficiently large, may undermine referrers' inclination to screen potential referrals for job fit (Bond et al. 2018). In short, given the significant variation in referrers' own fit and in their motivations for making referrals, selection is unlikely to fully explain why referral candidates appear to be a better suited for the job relative to those without such ties.

Thus, to account for referral candidates' apparent superior fit at application, we introduce a novel mechanism: differences in candidates' self-presentation. Building upon recent work on self-presentation within labor markets (He and Kang 2021, Kang et al. 2016, Ng and Leung 2019, Rivera 2012, Schlenker 2012), we posit that referral candidates' apparent superior fit arises from both the selection made by referrers and the strategic self-presentation efforts of the candidates themselves. We develop a simple theoretical framework wherein we: (a) delineate the attributes of job candidates' profiles likely to signal fit at application, (b) propose a set of barriers that may prevent job seekers from heightening these signals

within their application profiles, and (c) theorize how referral ties can serve as the means to surmount these obstacles, thus yielding better recruitment outcomes for referral candidates.

Benefits of Self-Presentation: Employers' Perceptions of Job Applicants' Fit

Self-presentation refers to a host of activities individuals undertake to control how they are perceived by others (Goffman 1955; Bolino et al. 2016; Schlenker 2012). In the labor market, strategic self-presentation aimed at increasing job seekers' chances of hire is an integral part of searching for work. While it is well established that job candidates make strategic efforts to present themselves during job interviews (e.g., Barrick et al. 2009; Higgins and Judge, 2004), an emerging body of research suggests that significant self-presentation work also occurs at the job application stage (e.g., Kang et al., 2016; He and Kang, 2021; Ng and Leung 2019; Rivera 2011). For example, low-skilled Upwork job candidates present their project proposals to prospective employers in relational terms to elicit more positive employer evaluations (Ng and Leung 2019). Similarly, minority job seekers endeavor to downplay signals that could reveal their racial identity and potentially trigger bias (Kang et al. 2016; He and Kang 2021).

Although this evidence suggests that self-presentation work is an integral part of preparing a job application, the effectiveness of such work is not always clear. For example, women who downplay their gender when pursuing gender-incongruent jobs inadvertently harm their prospects (He and Kang 2021). Further, strategies focused on tailoring the presentation of the candidate's credentials and experience may lead employers to discount such information out of concerns about its veracity. For example, the pervasive occurrence of "resume padding" in the labor market, which can be challenging to identify, raises questions about the credibility of information candidates provide about their background (e.g., Liu, 2020; Snyder and Zidar 2011; Henle et al., 2019). As such, rational employers might discount unverified candidate-provided information due to the suspicion that it could be exaggerated or even falsified.

Despite the potential credibility challenges, employers nonetheless base their screening decisions to a large extent on candidates' self-reports of their experience and background. This reliance on candidate-provided information stems, in part, from the limited alternative bases available for screening decisions (Spence, 1978; Leung, 2014). In the absence of alternative evidence, assessments of person-

job/organization fit based on candidates' self-reported experience are commonly regarded as the most legitimate bases for screening decisions (Caldwell and O'Reilly, 1990; Edwards, 1991; Sekiguchi and Huber, 2011). For example, in structured employment interviews, employers are encouraged to ask for specific instances from candidates' past experience that demonstrate that candidates' knowledge, skills, and abilities (KSAs) match those required for the job (e.g., Levashina et al., 2014). This prominence of experience-based fit is also reflected in broadly disseminated advice to candidates, encouraging them to present their experience in a manner that resonates with the position's description. For instance, the online job search platform Indeed.com advises candidates to tailor their resumes to highlight skills and experiences that align with the job description:

> "When an employer posts a job opening, they include a list of responsibilities and required (or preferred) qualifications. You will take those qualifications and add the same language or keywords throughout your resume to show you can fulfill the role. A tailored resume proves that you have the skills the employer is seeking and have previously used them to create optimal results at work." (Herrity 2023).

Thus, in determining whether to extend an interview invitation, employers heavily weigh fit based on the candidate's self-reported experience. Person-job fit is commonly conceptualized as the distance between the candidate's experience and the requirements of the target job across both a horizontal dimension (reflecting distance in terms of occupation or sub-occupation) and a vertical dimension (reflecting distance in levels of responsibility) that typify the division of labor (e.g., Charles and Grusky 2005). Additionally, employers are prone to consider person-organization fit (Sekiguchi and Huber 2011), conceptualized as the distance with respect to the norms, work practices, and culture of the organizations where the candidate has worked in the past (e.g., Oreopolous 2011; Kacperczyk and Younkin 2022). In conclusion, we anticipate that employers will exhibit a preference for candidates who signal horizontal, vertical, and organizational fit during the initial screening phase. Therefore:

Hypothesis 1 (H1): Job candidates' chances of advancing in the hiring process will increase when they present their prior experience as more closely matching the target job along horizontal, vertical, and organizational dimensions.

Referrals and Self-Presentation in Job Applications

Although the advice to strategically tailor one's profile is widely disseminated, considerable hurdles likely impede the broader adoption of tailoring practices among job seekers. First, the motivation to present an appropriately customized profile can be hampered by the significant effort required relative to an uncertain future payoff, especially considering the high rejection rates typically observed in the labor market (Fernandez-Mateo et al. 2022). High rejection rates also imply that job seekers often need to apply to numerous job openings, limiting the effort and resources they can allocate to each prospective job. This challenge becomes more pronounced as candidates, anticipating potential rejections, adopt a broad search strategy (Pager and Pedulla 2015), which requires greater profile adaptation for each application. Finally, defensive psychological strategies may be an inevitable result of an anticipated rejection, prompting job seekers to limit the amount of work and time devoted to each prospective employer, thereby generating a less threatening justification of an eventual rejection: "I was not trying that hard anyway" (Pyszczynski and Greenberg 1983). In sum, the task of resume tailoring poses a motivational challenge for job candidates.

Second, even when job seekers muster the willingness to tailor each resume, knowing how to effectively adapt their credentials is often unclear. Extant research demonstrates that adapting a resume and other job search materials can demand substantial interpretative and cognitive effort from job seekers (e.g., Schlenker and Pontari, 2000). Despite the widespread dissemination of job postings, applicants may not always fully understand how to prioritize the desired KSAs for a job. This can include, for example, determining whether to emphasize higher or lower levels of experience, given that prospective employers possess more information about their own preferences, creating an informational imbalance between employers and job seekers. In addition, even if job seekers accurately discern employer preferences, effectively tailoring one's resume still requires significant cognitive effort to craft a compelling narrative that aligns one's experience with the job requirements (Higgins and Judge, 2004).

Lastly, tailoring one's job application profile to enhance fit is not only a motivational and informational challenge but also an ethical one. Job seekers employ various strategies to convey desired impressions to hiring firms, which range from ethically ambiguous or liminal to outright ethically deviant (Anteby 2008; Becker 1963; Gabbioneta et al. 2019; Manning and Anteby 2016; Mohliver 2019). Ethically liminal strategies may involve, for example, exploiting ambiguities in the definition of certain terms and roles, or omitting certain information. In contrast, ethically deviant strategies can involve, for example, outright fabrication of experience. If discovered, such fabrications can have severe career consequences, even when the discovery occurs years later (e.g., Henle et al. 2019). As such, the potential for crossing into ethical deviance can further discourage candidates from engaging in profile tailoring.

Whereas these challenges can generally prevent candidates from adapting their resumes to increase their prospects, the presence of a referral tie is likely to alleviate them. First, a referral tie can encourage the candidate to go the "extra mile" when preparing their job search materials as they likely expect that their chances of succeeding are enhanced by the presence of a referral tie to the target firm. Consistent with this claim, prior research demonstrates that commitment and persistence in searching for a job are often higher when job seekers apply via referrals (Yakubovic and Lup, 2016). In addition, referred candidates may feel compelled to amplify their self-presentation efforts because of reciprocity norms (Gouldner 1960). In essence, because referrers incur a reputational risk by referring candidates for a position (Rees 1966, Rees and Shultz 1970, Saloner 1985, Smith 2005, Ullman 1966), candidates might reciprocate by striving to convey a more favorable impression in their job application. Finally, positions sourced through referrals often hold greater appeal because of reduced uncertainty regarding both the prospective firm and the position (Castilla et al. 2013, Greenberg and Fernandez 2016, Pedulla and Pager 2019, Sterling 2014). Increased attraction to referral jobs can reinforce a candidate's willingness to invest effort in adapting their profile for the target job.

Beyond contributing to overcoming motivational hurdles, referral ties can also provide valuable support in self-presentation by conveying norms of resume tailoring, mitigating information asymmetries inherent in the candidate–employer relationship, or helping candidates navigate ethical grey areas. Prior

research provides evidence that referrers motivated by financial rewards (e.g., bonuses) (Burks et al. 2015) or non-pecuniary gains (e.g., friendship) (Bond et al. 2018), often assist their referred candidates in navigating the complexities of approaching a prospective employer. For example, referrers provide their referred candidates with difficult-to-obtain information about the most appropriate time to apply for vacancies (Fernandez and Weinberg 1997), or advice relevant to salary negotiations (Seidel et al. 2000). By the same token, referrers may validate the applicability of broadly disseminated advice to tailor a resume and provide valuable guidance in doing so. Further, referral ties to the target firm can help gauge the extent to which candidates can tailor their profiles without transgressing ethical limits. Considering that individuals often seek guidance from network contacts to discern ethical ambiguities (e.g., Mohliver 2019), having access to a referrer can be a valuable resource when gaging the ethical appropriateness of resume adjustments. In sum, referral candidates will find themselves better positioned to access various kinds of assistance, support, and encouragement when crafting their resumes and other job search materials.

Overall, tailoring credentials and experience to match the demands of the target job can yield significant benefits for job candidates. However, as prior research implies, the tailoring process comes with substantial costs that can deter job seekers. Against this background, our theoretical framework proposes that, whether it be because of enhanced motivation or because of the provision of assistance, candidates are likely to present better-fitting renditions of their experience when applying via referrals. Thus, we predict:

Hypothesis 2 (H2): Job candidates will be more likely to present resumes that closely match the target job when they apply through a referral than when they are not referred.

SETTING AND DATA

High-Tech Labor Market

We test our arguments in the context of the U.S. high-tech industry, with a primary focus on the Silicon Valley high-tech labor market. Several features make this setting conducive to observing self-presentation as well as referral dynamics. First, the need to reflect on the presentation of candidates' work experience

is likely to be high in this setting because the high-tech labor market, especially in Silicon Valley, is characterized by high inter-firm mobility (Saxenian 1996; Cohen and Fields 1999). This dynamic, marked by frequent job changes across firms, tends to accentuate the need to engage in self-presentation work to frame a varied and potentially disparate set of experiences into a well-fitting and coherent career history (Leung 2014). Second, given the promise of high payoffs, Silicon Valley as well as other major tech hubs tend to attract skilled talent from all over the world (Saxenian 2000; Kerr 2013). Yet because newcomers often have limited experience and unfamiliarity with prevailing job search norms, they are especially likely to benefit from guidance in how to effectively present their profiles to prospective employers (Shih 2006). Further, given the perceived shortage of talent faced by firms in the high-tech labor market and the pressing need to recruit (Gage and Chapman 2011; Bessen 2014), individuals involved in firms' recruitment are likely to be motivated to assist prospective candidates in their job applications. Finally, despite its uniqueness and numerous idiosyncratic attributes, the high- tech sector plays an outsized role in job creation and innovation (e.g., Haltiwanger et al. 2016; Ferrary and Granovetter 2009). Hence, understanding the labor market dynamics within this sector is of substantive interest.

Job-Applicant Tracking System Dataset

Detecting when and how job seekers adapt the presentation of their backgrounds before they apply for a job is challenging. Apart from experimental research on student and online participant recruitment samples (e.g., He and Kang 2021; Kang et al. 2016), empirical limitations typically prevent researchers from examining the prevalence and nature of adaptations in resume profiles in live hiring contexts. We take advantage of data from a job-applicant tracking system that firms in the U.S. high-tech sector, mainly in San Francisco/Silicon Valley, commonly used to post job openings online. These job postings are disseminated across various online job boards, social media platforms, and companies' career websites. A candidate applies for a job by uploading their resume using a link on the posting. The system then parses the uploaded resumes and populates the information into a structured format listing the candidate's work experience and educational history, which the candidate retains the ability to edit. After validating that their resume information is correct, the candidate answers a few additional questions before submitting

their application. The database stores candidates' profiles, which are retrievable if candidates subsequently apply for a position at another firm on the platform.[1] Importantly, before applying to a position posted by a different firm, candidates can update information on their profile (e.g., their career history). We gained access to an anonymized database containing records of job applications on the platform for the period 50 months from March 2008 to April 2012. For each application, the database includes career histories and other information recorded within each job application, along with the screening outcomes (i.e., whether the candidate was interviewed, received a job offer, or was hired).

Our analysis sample contains 140,673 applications corresponding to 41,831 individual job candidates.[2] These applications were submitted to 2,594 distinct job postings published by 218 individual firms. A significant share of firms in our sample are Silicon Valley–based startups: nearly three-quarters (70.9% percent) of the jobs postings originated from the Silicon Valley/San Francisco Bay Area, and 45.4% of the firms sampled had fewer than 10 employees when they started recruiting on the platform. The postings corresponded to full-time jobs ranging from "Entry" to "Executive" levels (except for the 3.0% of jobs posting for internships) and spanned across various organizational departments, with engineering representing the most prevalent job department (36.9% of job postings). The candidate sample had a median of 7 years of experience. Consistent with prior research on the high-tech industry (Petersen et al. 2000; Saxenian 2000; Parasurama et al. 2020), our sample is predominantly male (only 33.7% of applications are from female candidates) and contains a significant share of foreign workers (25.7% of applications are from non-U.S. citizens/permanent residents). Finally, applications to different

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[1] Candidates can opt in to have their resume made available to employers with access to the platform's searchable resume database (note that we were not provided details of which candidates opted into this feature or which firms purchased access to the resume database).

[2] Of the 544,462 applications in our dataset, 63,917 applications came from candidates who applied from sources other than the Internet (e.g., internal candidates, candidates found through search firms) and thus do not have profiles stored in the multi-firm database. Of the remaining 480,645 applications, 324,887 applications came from candidates who applied to a single employer. We set single-employer applications aside, given our focus on how candidates change their self-presentation across employers. Excluding these cases left a sample of 155,578 applications from candidates who applied to at least two employers on the platform. We further excluded 1,064 cases corresponding to applications for jobs located outside the United States. Finally, we excluded 5,163 cases with missing career histories, 5,655 applications because of other missing data, and 3,203 cases that were extreme outliners (99th-percentile) in terms of number of resume entries or number of firms pursued, yielding a sample of 140,673 applications.

firms were usually sent a little more than a month apart (a median of 43.9 days between applications), implying that, on average, these were nearly contemporaneous searches (Obhukova and Lan 2013).

Analytical Strategy

To evaluate the effect of referral ties on self-presentation, an ideal research design would hold the candidate and the job characteristics constant while manipulating access to referrals. Yet fully accounting for unobserved job-level heterogeneity, potentially associated with the presence of referral ties, is likely prohibitively difficult given the significant trade-offs involved. For example, if we were to compare the same candidate applying to the same job, the sample would be notably limited and potentially skewed, as instances of firms reconsidering a candidate for the same position are rare (Fernandez and Galperin 2014). Further, even if such sample were available, it is unlikely candidates would engage in significant alterations to their profiles when targeting the same firm and job, given the high probability of detection.

In line with previous research, we therefore employ candidate-fixed-effect specifications to analyze the determinants of self-presentation (Yakubovic 2005; Obukhova and Lan 2013; Fernandez and Galperin 2014). This approach allows us to account for time-invariant, unobserved candidate-level heterogeneity, all while including an extensive set of observable job and firm characteristics as controls in our models. Conceptually, we leverage the applicant tracking system's storage of the versions of candidates' resumes submitted to different firms to compare how job seekers present themselves to different employers. Using this setup, we assess whether applications submitted by the same candidate to different firms: (a) result in higher interview chances when they display stronger signals of person–job/organization fit (H1), and (b) are more likely to include such favorable signals when submitted via referrals (H2).

Dependent Variables

Interviews (H1). Our theory posits that employers will perceive candidates who present resumes that more closely match the target job as a better fit for the position and therefore will be more likely to advance them in the hiring process. To assess this claim, we measure the propensity of employers

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extending an interview invitation, creating a dummy variable equal to 1 if a job application led to an invitation to interview and 0 otherwise.

Candidates' Perceived Fit (H2): We next examine whether candidates applying through a referral implement resume changes that increase their horizontal, vertical, and organizational fit with the target job. We measure fit along these three dimensions as follows:

Horizontal fit. As a measure of horizontal fit, we computed a textual similarity score between each job title listed on a resume and the title of the job pursued (Parasurama et al. 2020, Sekiguchi and Huber 2011, Waung et al. 2017). This score ranges from 0 to 1, with 1 indicating an exact match and decreasing scores implying a progressively lesser degree of similarity.[3] We average this score across resume entries to assess a resume's average similarity with the job title pursued. In supplemental analyses (see Online Supplement 1), we show that averaging these scores, as well as subsequent fit measures, yields more robust predictions of interview rates than alternative measures (e.g., most recent score), likely because the sample is relatively young (i.e., 7 median years of experience).

Figure 1 Panel (a) provides an example of a resume modification that increases the horizontal fit of the candidate's profile. To ensure confidentiality, we anonymize employer names and unreferenced job titles (e.g., "Employer 1," "Job title 1") in our examples. The candidate in Figure 1 Panel (a) applied for the position of "VP of Business Development" and applied approximately one month later for the position of "VP of Marketing" at a different employer. In the second application, the candidate changed the job title of the most recent resume entry from "Vice President, Business Development & Innovation" to "Vice President, *Marketing* & Innovation" (emphasis added).

-Insert Figure 1 about here-

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[3] We use the *matchit* package in Stata to calculate a textual similarity score (Raffo 2015). This package uses a vectorial decomposition technique to decompose the text string into elements of two characters (grams) using a moving-window basis. The package then computes the similarity score as the Jaccard index ($= m$ / sqrt($s1 \times s2$)), where m is the number of grams that matched between the two strings, and $s1$ and $s2$ are the number of grams in each of the strings compared (Christen 2006, Pfeifer et al. 1996, Phua et al. 2007, Raffo and Lhuillery 2009).

Vertical fit. As a measure of vertical fit, we consider the extent to which the seniority level of the candidate's background matches the seniority level of the pursued position. Hence, we initially identify senior job titles within candidates' prior job titles based on whether they included prefixes or phrases conveying seniority or reporting relationships.[4] We then set the dummy variable *Senior Job Title* equal to 1 if a resume entry included one of these seniority designations and 0 otherwise, and average this measure across entries in a resume. We then computed our "vertical fit" measure by assigning greater weight to job title seniority when candidates apply for more senior-level positions. More specifically, we multiply the resume's average job title seniority by the level of job being pursued, scaled between 0 and 1 where: 0 = "Internships (Level 0)," 0.33 = "Entry-level (Level 1)" positions, 0.66 = "Experienced/Mid-level (Levels 2 and 3)" positions, and 1 = "Manager/Executive (Levels 4 and 5)." The resulting vertical fit score ranges from 0 to 1, with higher values indicating higher seniority in applications to higher-level jobs. As a robustness check, in Online Supplement 2 we replicate subsequent analyses including the full seniority x job level interactions.

Figure 1 Panel (b) provides an example of a candidate increasing their profile's vertical fit across different job applications. In this instance, the candidate applied initially to a (Level 2) "Online Marketing Manager" position and, two months later, to a (Level 4) "e-Commerce Marketing Manager" position at a different firm. Between these two applications, the candidate modified the title of the position they held at "Employer 3" from "Technical Support Representative" to "Business Development Manager," thereby displaying more senior experience in pursuing this more senior position.

Organizational fit. Finally, as a measure of organizational fit, we consider the geographic location (i.e., country) of a candidate's past work experience, given significant research documenting that different national cultures influence organizational practices and norms (e.g., Smith et al. 1994). To assess organizational fit with these U.S.-based jobs, we identify any references to foreign countries within

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[4] Prefixes and phrases coded as conveying seniority include "senior," "sr.," "lead," "executive," "principal," "supervisor," "manager," "director," "president," "VP," "CEO," "CFO," "CMO," "CTO," "administrator," "head," and various derivations of these terms.

candidates' resumes and constructed a dummy variable set to 1 if the candidate mentioned a foreign country in a resume entry, and 0 otherwise. We then average these scores across entries on a resume and invert the sign to obtain an organizational fit measure ranging from –1 to 0. A score of –1 indicates that all resume entries reference foreign countries, while the score of 0 indicates if none do.

Figure 1 Panel (c) provides an illustration. In this instance, the candidate applied for the "C/C++ Engineer" role in December 2010 and for the "Director of Engineering" position in February 2012. Between the two applications, the candidate deleted references to "India" from the name of a prior employer, thereby signaling higher person-organization fit with these U.S.-based jobs.

Table 1 shows the summary statistics for these fit measures. As can be seen in columns (2) and (4), there is nonnegligible variation in these measures "within" each candidate opening the possibility that such variation is at least partly induced by candidates' self-presentation work.

-Insert Table 1 about here-

Independent Variable: Referral Applications

As part of the job application, candidates are asked to indicate whether they were referred for the position and, if so, to provide the name and email of the referring individual. However, due to the anonymization process of the data, the specific identities of the referrers were removed, preventing us from discerning individual referrers and thereby distinguishing between referrals made by employees and non-employees. This operationalization is consistent with prior work (e.g., Petersen et al. 2000; Fernandez and Fernandez-Mateo 2006) and appropriate for our study as the mechanisms we theorize do not hinge on the referrer being a current employee of the hiring organization. Our *Referral* indicator variable equals 1 if the candidate provided the name/email of a referrer and 0 otherwise. Referral-based applications account for 66.3% of the 140,673 applications included in our analysis sample. It is important to note that this percentage of referral-based applications is significantly higher than what is observed in the sample of applicants to a single firm (9.6%). Additionally, among applicants to multiple firms (N = 140,673), we observe a significantly higher prevalence of referrals after the first application: 28.9 percent of applications to the first firm pursued have referrals, in contrast to 85.4 percent of

applications to subsequent firms. One explanation for this pattern is that, once a candidate applies for a position on the platform, their information can become part of the platform's resume database if they opt-in, making it accessible for purchase by other employers using the platform. Although, in line with the prior literature, we cannot determine how referral ties were formed, this feature suggests that candidates who had previously applied to a position on the platform are at greater risk of forming referral ties with other employers using the same platform. Importantly for our purposes however, the theoretical mechanisms posited remain applicable even if referral ties were forged through prospective employers searching for candidates on the platform. Further, to allow for the possibility that referral ties formed after the first application differ from initial ties, we conduct supplemental analyses to assess the effect of referral ties on fit, distinguishing between the first application submitted and any subsequent applications. Our findings suggest that the association between referral ties and fit remains robust, even when accounting for this distinction (refer to Online Supplement Table OS.6).

Control Variables

We include in our specifications a battery of controls for other application and job/firm characteristics that may be associated with the referral status and candidate's self-presentation. Table 2 shows the summary statistics of these control variables, and Online Supplement Table OS.3 shows correlation coefficients. Perhaps most importantly, variation in fit measures might arise due to changes in the job pursued or adjustments in the candidate's resume presentation across different job applications. To net our estimates of the underlying job changes, we control in our specifications for job characteristics affecting fit: namely, the baseline horizontal fit (i.e., the horizontal fit of the candidate's initial job titles with the title of each job pursued) in models of horizontal fit, and the job level in models of vertical fit.

-Insert Table 2 about here-

METHODOLOGY

To test our hypotheses, we estimate the following specifications:

$$Interview_{ij} = \beta_0 + \beta_1 \boldsymbol{Fit_{ij}} + \beta_2 \text{Referral}_{ij} + \beta_3 \text{CV}_{ij} + \beta_4 \text{Candidate FE}_j + \varepsilon_{ij}. \qquad (1)$$

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In Equation (1), the dependent variable *Interview$_{ij}$* measures whether application *i* submitted by candidate *j* yielded an interview. The coefficient of interest, β_1, captures the effect of resume fit (i.e., horizontal fit, vertical fit, organizational fit) on the probability that a candidate is interviewed, as hypothesized in H1. Specification (1) includes candidate-fixed effects and controls, implying that β_1 estimates whether *a given candidate* is more likely to be interviewed when their resume matches more closely the pursued job.

$$Fit_{ij} = \beta_0 + \beta_1 \text{Job Characteristics Affecting Fit}_{ij} + \beta_2\mathbf{Referral}_{ij} + \beta_3\text{CV}_{ij} + \beta_4 \text{ Candidate FE}_j + \varepsilon_{ij}. \tag{2}$$

Equation (2) evaluates H2, which posits that candidates are more likely to present better matching resumes when applying via referrals. In this specification, the dependent variables comprise our measures of the fit (i.e., horizontal fit, vertical fit, organizational fit) that candidate *i* displays on application *j*. Analogous to the prior specification, Equation (2) includes candidate-fixed effects and controls, as detailed earlier. The coefficient of interest, β_2, captures the effect of referrals on fit. H2 implies that β_2 is positive and significant. In both specifications, we cluster standard errors by candidate to account for the nonindependence of different applications corresponding to the same candidate.

RESULTS

We begin by assessing H1, which posits that fit increases the candidate's likelihood of securing an interview (Table 3). First, in column 1, we examine this relationship within the full sample, retaining cases of candidates who apply to a single firm (N = 462,053). Estimates in column 1 show that higher fit increases candidates' chances of advancing in the hiring process; this is the case for horizontal, vertical, and organizational fit measures ($p < 0.001$), consistent with prior literature (e.g., Parasurama et al. 2020; Oreopoulos 2011). Column 2 replicates this analysis on the sample of candidates who submitted applications to more than one firm (N = 140,673) and shows very similar results. Column 3 adds candidate-fixed effects (as specified in Equation (1)). Consistent with H1, horizontal and vertical fit remain positively associated with the likelihood of securing an interview ($p < 0.001$). Although organizational fit is only marginally significant in this specification ($p < 0.10$), other research validates

the premise that employers tend to favor candidates with domestic (rather than foreign) experience, particularly in settings where recent immigrants are prevalent among job applicants (Oreopoulos 2011; Viet and Thijsen 2021).

-Insert Table 3 about here-

With respect to substantive significance, a 1 standard deviation increase in horizontal fit is associated with a 0.4% higher probability of securing an interview ($0.039 \times 0.095 = 0.004$); the corresponding percentages are 0.3% for vertical fit ($0.037 \times 0.078 = 0.003$) and 0.1% for organizational fit ($0.017 \times 0.036 = 0.001$). Relative to the average interview rate in the sample (4.3%), a 1 standard deviation increase in horizontal fit increases the probability of an interview by 8.6% ($0.004 / 0.043 = 0.086$); the corresponding increases are 7.0% ($0.003 / 0.043 = 0.070$) for vertical fit and 2.3% ($0.001 / 0.043 = 0.023$) for organizational fit. Although the magnitude of these effects is modest, they are not negligible when calibrated against the well-established effects in the labor market literature (e.g., the effects of race and gender on call-back rates reported in prior work are on the order of 20-70% [Bertrand and Mullanaithan 2003; Booth and Leigh 2010]). Our estimates are certainly smaller than the effect for these core demographics, but they are nonnegligible in comparison, especially if we consider the low cost of modifying a resume.

We next examine whether candidates are more likely to submit resumes with favorable fit signals when applying to the firm via a referral (H2). Table 4 shows the results of ordinary least squares models of horizontal, vertical, and organizational fit as a function of referral status. We first estimate this relationship within the full sample, which includes candidates who applied to a single firm (columns 1–3, N = 462,053). Consistent with prior literature (e.g., Fernandez and Weinberg 1997, Fernandez et al. 2000), referral applicants systematically presented profiles more closely matching the job for all three measures of fit (columns 1–3; $p < 0.001$). As the next step, we re-estimated this relationship within the subsample of applicants to multiple firms (N = 140,673), including candidate-fixed effects, as specified in Equation (2). The results are strikingly consistent: When candidates apply via referrals, they present

resumes with 0.003 higher horizontal fit, 0.001 higher vertical fit, and 0.002 higher organizational fit (columns 4–6; $p < 0.001$ for job-title and organizational fit, and $p < 0.10$ for vertical fit). Thus, H2 is supported robustly for horizontal and organizational fit, and marginally for vertical fit.

We illustrate the magnitude of these effects with a few examples. Starting with the effect on horizontal fit, consider a candidate who first applies to a "VP of Marketing" position. The candidate has ten entries on their resume: five with job titles equivalent to "director of online media" (horizontal fit score = 0.257), and five with job titles equivalent to "director of web and online marketing" (horizontal fit score = 0.514). This yields an average horizontal fit score of 0.385. The candidate then applies for another "VP of Marketing" position at a different firm and changes one of their prior job titles from "director of online media" to "director of web and online marketing." This adjustment increases their resume's average horizontal fit from 0.386 to 0.411, a difference of 0.026. This increase is approximately nine times larger than the marginal effect of referral ties estimated (0.003).

With respect to vertical fit, consider a different candidate applying for "VP of Marketing" positions, all classified as Level 5 "Executive" positions. The candidate's first resume lists eight non-senior positions (e.g., "online media associate") and two senior positions (e.g., "director of online media"), resulting in an average vertical fit score of 0.2. When applying for another "VP of Marketing" position, the candidate replaces one non-senior job title with a senior job title, increasing their vertical fit score by 0.1. This increase is about one hundred times larger than the marginal effect of referral ties estimated (0.001). Lastly, with respect to organizational fit, consider another candidate who on their first application lists ten prior employers, four of which mention a foreign country. In their second application, they omit one of these foreign references, improving their organizational fit score by 0.1. This effect is about fifty times larger than the marginal effect of referral ties (0.002).

As these examples illustrate, the effects of referral ties on each individual measure of fit are small. They are nonetheless noteworthy if we consider them jointly: referral ties are simultaneously associated with statistically significant increases in horizontal, vertical, and organizational fit. Further, it is important to consider the very conservative nature of our measures of self-presentation, which only

incorporate changes in job titles and prior employers. These measures do not incorporate changes to more descriptive content typically included in job application materials (e.g., descriptions of responsibilities held, accomplishments, objectives, etc.). To the extent that changes to job titles/employers are indicative of broader self-presentation work which might be reflected in these more descriptive parts of the resume, our estimates of the effect of referral ties are likely to be conservative.

<div align="center">-Insert Table 4 about here-</div>

Supplemental Analyses: Mechanism Checks

The preceding results indicate that (a) candidates have better interview chances when presenting tailored resumes (H1), and (b) candidates are more likely to present such resumes when applying to a firm via a referral (H2). To further examine the mechanisms through which referrals might influence candidates' self-presentation, we conducted a host of additional analyses, while also fielding a survey to a sample of high-tech professionals. First, we measured specific changes that candidates make to their career histories across applications to consecutive firms to directly establish the relationship between self-presentation work (i.e., resume changes) and resume fit. Further, we examined how this relationship was affected by referral ties overall, as well as in instances where we would expect referrals to be more influential. As an additional implication of our arguments, we examine candidates' propensity to engage in more deviant types of self-presentation, based on the premise that referral candidates might be more willing and more able to avoid crossing these ethical boundaries. Finally, we assess the scope of referrals' influence by examining the extent of its persistence beyond the focal application. We outline these analyses in detail below.

Do candidates increase their resume's perceived fit through self-presentation work? Our results show that well-fitting resumes are associated with interview chances, and that resume fit is systematically higher on referral applications. However, the results up to this point stop short of directly showing that self-presentation work increases resume fit, and how this relationship is affected by referral ties. It could be, for example, that differences in fit across applications to different firms do not reflect strategic resume *changes* undertaken by job candidates but might, instead, arise due to candidates simply updating their

resumes with more recent experience without any strategic intent. Hence, to provide more direct evidence of the relationship between resume fit and strategic *adaptations* in the presentation of past experience, we compared resumes presented to consecutive employers and measured whether the focal application exhibited changes relative to the application submitted to the prior employer. More specifically, we measured four types of resume changes:

Employer changes. We construct an indicator variable for *employer changes* set equal to 1 if a resume included entries that match the employment start date of an entry on the prior resume but displayed a different employer and 0 otherwise.[5]

Job Title Changes. We construct an indicator variable for *job title changes* set equal to 1 if a resume featured entries that matched the employment start date and the employer of an entry on the prior resume but show a different job title and 0 otherwise.

Resume Entry Additions. We construct an indicator variable for *resume entry additions* equal to 1 if a resume included entries corresponding to employment start dates that did not match any of the start dates listed on the prior resume and 0 otherwise.[6]

Resume Entry Deletions. Finally, we construct an indicator variable for resume entry *deletions* set equal to 1 if a resume did not contain any entry with an employment start date present in the prior resume and 0 otherwise.

Given that our measures of resume changes are based on comparing applications to consecutive firms, we evaluate these changes for applications submitted to all firms except the initial one pursued,

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[5] Some changes in employers may involve innocuous corrections (e.g., a candidate may have indicated that they worked at "Cisco" on the first application and "Cisco Inc." on the second application). Hence, we inspected each change manually and using a textual similarity score, retaining only employer changes with no discernible link between the employer listed on the prior resume and the current resume. Changes in employers may also reflect name changes related to M&A activity. To assess this possibility, we identified the 100 largest M&A transactions from 2000–2010 (IMAA Institute 2017) and found no instances in which the employer changes measured corresponded to these M&A transactions. Although name changes could reflect smaller M&A transactions, the resulting measurement error would tend to attenuate the magnitude of our results.

[6] Because our focus is on self-presentation strategies rather than simple resume updates, we exclude additions corresponding to start dates after the first application date. For example, if the prior application was submitted in 2010 and the candidate added resume entries in the second application corresponding to employment start dates after 2010, such changes are not coded as additions.

which provides the baseline for our measures (N = 90,779). In Table 5, we report models of fit signals as a function of whether a resume includes these changes, referral status, controls, and candidate fixed effects. Estimates show that different types of resume changes are associated with systematically better fit signals. First, when candidates modify prior employers reported on their resumes, these changes result in a version of their resume with better organizational fit (Model 3; $p < 0.05$). Second, when candidates modify previous job titles, these changes are systematically correlated with greater horizontal (Model 1; $p < 0.001$) and vertical fit (Model 2; $p < 0.05$). Further, when candidates add resume entries, these additions result in a version of their resumes with higher horizontal fit and organizational fit (Models 1 and 3, respectively; $p < 0.001$). Finally, when candidates delete resume entries, these deletions result in a version of their resume with higher horizontal (Model 1; $p < 0.05$) and vertical fit (Model 2; $p < 0.001$). In sum, candidates change how their prior experience is portrayed in ways that systematically improve their resume's fit to the target job.

Is self-presentation work done on referral applications more predictive of resume fit? Next, we test the implications of our core argument which suggests that changes to a resume are associated with better fit when candidates have access to referrals. Thus, we evaluate the interactions between referrals and resume changes (including any of the changes measured, i.e., job title changes, employer changes, additions, deletions) in predicting horizontal, vertical, and organizational fit. As shown in Models 4-6 in Table 5, changes made on referral applications are significantly more likely to increase horizontal, vertical, and organizational fit (Model 4: *Referral × Changes*; $p < 0.001$; Models 5 and 6: *Referral ×* *Changes*; $p < 0.05$). Thus, across various dimensions of fit, changes made prior to applications to positions reached via referrals have a significantly more positive effect on the resume's fit.

-Insert Table 5 about here-

Do referral ties influence self-presentation through motivation and assistance? We next probe deeper the motivation and assistance mechanisms through which we expected referrals to affect self-presentation. Specifically, we examined cross-sectional heterogeneity to assess whether the effect of referrals is systematically more pronounced when their motivational or assistance benefits are expected to

be more significant. One such instance is when candidates are less experienced in searching for jobs.

Those with little labor market experience stand to benefit more from referrals because they have less

knowledge about self-presentation tactics and may be more prone to experiment with how they present

themselves (Ibarra 1999). In addition, inexperienced candidates may, in general, anticipate lower chances

of success in job search and therefore experience a larger motivational boost from having a referral. Thus,

if referrals influence candidates' self-presentation via motivation and assistance, the influence of such ties

will be pronounced among inexperienced candidates.

In Table 6, we replicate the analyses reported in Table 5 Models 4-6 but stratify by the job

seekers' years of experience. The results are consistent with referrals having a stronger influence on job

seekers' self-presentation earlier in their careers. For early career job seekers, resume changes made on

referral applications have a significantly stronger effect on horizontal, vertical, and organizational fit

(column 1, 3, and 5: *Referral × Changes* interaction; $p < 0.05$). Notably, such interactions are not

distinguishable from zero for more experienced job seekers (columns 2, 4, and 6: *Referral × Changes*

interaction, nonsignificant). In unreported analyses (available upon request), we estimated models

including the three-way interaction of *Referrals × Changes × Above-Median Experience* and find that this

three-way interaction is significant in predicting horizontal fit ($p < 0.05$), and marginally significant in

predicting organizational fit ($p<0.1$). In sum, our estimates indicate that referral ties have a more

pronounced effect on the effectiveness of candidates' self-presentation when candidates stand to benefit

the most from the motivation and assistance provided by referrals (i.e., when job seekers are more

inexperienced).

-Insert Table 6 about here-

Do candidates experience heightened reputational concerns in the presence of referrals? Our

arguments imply that candidates experience heightened reputational concerns in the presence of referrals:

when applying through referrals, candidates are likely to be more concerned about their own reputation as

well as concerned about the reputation of their referrers. To examine one implication of these arguments,

we next probe how referral ties affect the ethicality of the self-presentation strategies candidates employ. In addition to heightened reputational concerns, candidates may perceive a higher chance of malfeasance detection in the presence of referrals (Becker 1968; Smith 2005), while also being better able to discern ethical boundaries through referrals' assistance (e.g., Mohliver 2019).

To assess these claims, we further ascertain the nature of resume changes measured in terms of their likelihood to involve deception. We consider employer changes to be more likely deceptive, given that two different accounts of where the candidate started working on a given date are unlikely to both be true. In contrast, we consider other changes measured (i.e., changing prior job titles, adding/deleting resume entries) to have more benign, liminal interpretations. Job titles may not always be precisely specified or may evolve over time (Cohen and Mahabady 2022). Further, in adding/deleting resume entries, candidates may simply be selectively disclosing accurate information. We thus consider job edits, additions/deletions to be liminal resume changes, whereas employer changes are closer to the deviant side of the ethicality spectrum (Henle et al., 2019). In Online Supplement 4, we provide survey evidence which further validates these distinctions.

We then examine how the presence of referral ties influences candidates' propensity to make different kinds of changes to their career histories. We first estimate the probability that candidates make *any* changes (either deviant or liminal) and then estimate the likelihood of making deviant changes (i.e., employer changes) conditional on making any changes. Online Supplement Table OS.5 shows linear probability models of (a) the probability of making any resume changes relative to making no changes (column 1) and (b) the probability of making employer changes, conditional on making any resume changes (column 2). Results in column 1 show that referral applicants are significantly more likely to make any resume changes ($p < 0.001$), consistent with the notion that these candidates are more motivated or have more assistance in preparing their resume profiles before applying. However, results in column 2 show that, conditional on making changes, having a referral decreases the probability of a candidate making employer changes ($p < 0.05$). These findings suggest that, although referral candidates do more self-presentation work, they tend to engage in self-presentation strategies that are less deviant.

How broadly applicable is referrers' influence? Finally, to gain further insight into the nature of assistance and motivation that referrals might confer, we examine the scope of referrers' influence on self-presentation, specifically whether their influence extends beyond the focal application. We thus assess whether having a referral tie on the application to the prior firm is associated with a better fit displayed on the current application. As can be seen in Online Supplement Table OS.6, having a referral on the *prior* application increases the horizontal and organizational fit in the *current* application (Model 1 and Model 5, p<0.001). Thus, referrers' influence has some persistence, likely because job-search in this context is largely targeted, occurring for the most part within a particular job department (i.e., 62.0 percent of applications by the same candidate to different firms target the same department). As a result, job title tailoring performed on the focal application is likely to also be relevant to other, often adjacent jobs that the candidate subsequently pursues.

To gain further insight into the nature of this persistent influence, we examine whether there are diminishing returns to referrals, whereby the first referral is more influential than the subsequent ones. This would be the case if, for example, referrals provide only general advice on improving a resume that need only be given once (e.g., highlight marketing when applying to marketing jobs). In contrast, it could be that each new referral provides new insights or added motivation, so that the effects of referrals does not diminish with prior referrals. As can be seen in the Online Supplement Table OS.6 this is indeed what we find, as there is no evidence of the referral effect decreasing in presence of past referrals (Models 2, 4, and 6, *Referral × Referral (lagged)* interactions are not significant at conventional levels). Hence, although the influence of referrals persists, there is no evidence of diminishing returns to referrals, implying that additional referrals provide incremental value in terms of improving candidates' self-presentation.

Survey of High-Tech Professionals

Although our observational data provide compelling evidence that referral ties influence whether and how job seekers tailor their profiles, they do not directly measure the mechanisms through which referrals influence self-presentation. Hence, we supplement the job application dataset with self-reports

from a survey of managers and professionals in the U.S. tech industry. We used Prolific, an online recruitment platform, to recruit 280 respondents to complete a survey about job-search strategies. The sample was screened based on criteria aimed at matching the sample of candidates in the job application data: U.S. residence, highest education of a bachelor's degree or above, currently working in the technology industry (i.e., IT, technology, software, and related industries), and currently holding a trained professional or managerial role (i.e., managers or trained professionals). Online Supplement Table OS.4 shows the professional and demographic characteristics of the survey sample.

The survey first asked respondents to consent to participate in a survey about job-search strategies and to answer demographic questions to ensure that they met our screening criteria. We then asked the respondents to indicate the frequency with which they used job boards and referrals through the hiring firm's employees or non-employees in their job search.[7] To assess the influence of both employee and non-employee referrals, we then randomly assigned participants to one of two conditions: (1) the first condition asked them to recall the last time they applied for a job through a referral from an *employee* of the hiring firm, and (2) the second condition asked them to recall the last time they applied for a job through a referral from a *non-employee* of the hiring firm. We then asked questions about their self-presentation work in pursuing the focal position, including (a) how much they worked on their resume, (b) how they adapted their resume, and (c) what their goals were in adapting a resume. Finally, we asked questions about how their referral ties affected their resume presentation.

With respect to the amount of self-presentation work performed, we asked subject to compare the amount of work devoted to preparing their resume the last time they applied to a job via a referral with the last time they applied to a job using an online job board. Although a significant share of respondents indicated that the amount of self-presentation work is unaffected by the presence of a referral (54.2 percent), the distribution of responses is clearly skewed in the positive direction: 31.9 percent of

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[7] We excluded from our sample participants who indicated they had no experience finding jobs through referrals (i.e., 13 participants who indicated they never used referrals from employees of the hiring firm and 37 participants who indicated they had never used referrals from non-employees). We excluded an additional 14 cases who failed attention checks, yielding a sample of 216 for our analyses of mechanisms (shown in Figure 2).

respondents indicate doing more self-presentation work on referral applications, and only 13.9 report

doing less work. On average, the mean response is significantly above the response range mid-point

(mean = 3.24, H_0: mean = 3; $p < 0.001$; N = 216). This result validate the findings from our job

application data: candidates tend to devote more effort to their self-presentation when applying for jobs

via referrals.

       With respect to the mechanisms, we asked subject about the motivational impact of referral ties,

and about any self-presentation assistance provided by referrers. With respect to motivation, respondents

rated the following statements: "Jobs that I find through Method A [employee/non-employee referrals]

are jobs that I'm typically more motivated to get than jobs I find through Method B [online job boards],"

"I want to present my best self when applying to a job though Method A [employee/non-employee

referrals] because I don't want the person who referred me to look bad." We next asked respondents

whether they received assistance consisting of (a) information about the specific position/firm pursued

(i.e., "The last time I applied to a job through Method A[employee/non-employee referrals], the person

who referred me provided me information about what the firm was looking for that helped me prepare my

resume") and (b) more general self-presentation assistance (i.e., "The last time I applied to a job through

Method A[employee/non-employee referrals], the person who referred me helped me reflect on how best

to present my credentials and experience in general").

       Figure 2 displays the results pertaining to the motivation and assistance mechanisms. With

respect to motivation, panel A shows that participants indicated being more attracted to jobs found via

referrals (mean = 3.64, H_0: mean = 3; $p < 0.01$; N = 216) and being motivated to improve their self-

presentation because of norms of reciprocity (mean = 4.06, H_0: mean = 3; $p < 0.01$; N = 216). These

findings allay concerns that the referral effect might be driven exclusively by the inherent greater

attractiveness of jobs found via referrals. Rather, the survey findings provide evidence for reciprocity

norms being an important mechanism (Gouldner 1960): survey participants showed a particularly high

level of agreement that concerns over the referrers' reputation motivate them to improve their self-

presentation ($mean_{attraction} < mean_{reputation}$; $t = 4.54$; $p < 0.01$; N = 216). With respect to assistance, panel B

indicates that referrers provide both inside information about what the prospective employer might value (mean = 3.64, H_0: mean = 3; $p < 0.01$; N = 216) and more general assistance in job seekers' self-presentation (mean = 3.55, H_0: mean = 3; $p < 0.01$; N = 216). In Online Supplement 7, when we separate the survey responses by the referral type (i.e., employee or non-employee), and find that, even for non-employee referrals, participants' responses were consistent with the proposed mechanisms.

--Insert Figure 2 about here—

When considered in conjunction with the other supplemental analyses, these survey findings strongly support the mechanisms posited. Our mechanism tests show that referrals have the strongest influence on self-presentation when the potential assistance or motivation that results from these ties are likely to have yield the largest benefits (i.e., among inexperienced candidates) and the survey findings validate the motivational and assistance benefits of referrals. Further, although referral candidates may be more motivated to present well, we show that they are less likely to engage in deviant forms of self-presentation, consistent with the survey results showing strong support for the notion that concerns about their referrer's reputation are salient. Finally, our mechanism tests suggest that referrers' influence is at least partly general in nature, impacting candidate's self-presentation beyond the focal application. The survey results validate this finding as subjects report that they receive both job-specific and more general advice when applying through referrals.

DISCUSSION AND CONCLUSION

Recruiting job candidates through referral networks is widespread in modern labor markets (Burks et al. 2015, Fernandez et al. 2000, Kalleberg et al. 1996, Marsden 1994, Marsden and Campbell 1990). Referrals are considered an efficient recruiting source partly because candidates sourced through referrals are perceived as more suitable at the job-application stage (e.g., Fernandez and Weinberg 1997, Fernandez et al. 2000). Although extant research has largely attributed this pattern to referrers' selection (Rees 1966, Rees and Shultz 1970, Saloner 1985, Smith 2005, Ullman 1966), in this study, we introduce a novel explanation: differences in self-presentation. Using unique data from an applicant tracking system used by firms in the U.S. high-tech industry that allows for comparing resume presented to different

employers, we find evidence consistent with our predictions. When applying for a job through a referral, candidates present versions of their resumes with higher fit along several dimensions. Importantly, referral candidates achieve these better-fitting profiles at least in part because they make changes to the presentation of their prior experience and these modifications result in better apparent fit.

Our study makes several contributions. First, our findings revisit the current understanding of the commonly observed pattern of referral candidates displaying better fitting profiles in their resumes and job applications. Although this regularity has often been attributed to referrers' selection, we document that referral candidates display seemingly more suitable profiles partly because they are more likely to adapt their resume in favorable ways when they apply through a referral tie. Additional survey evidence indicates that a referral tie to the target firm motivates workers to modify their resumes and that referrers commonly assist candidates in preparing their application profiles. Our findings thus have important implications for employers who may want to consider these dynamics when evaluating referral-based recruiting. While it is important to acknowledge that our findings do not preclude the possibility that referral candidates are still a better fit on dimensions that are revealed post-hire (e.g., Castilla 2005; Burks et al. 2015), they do suggest that referral candidates will *appear* to be a good fit at the point of job application partly because of self-presentation differences. Thus, a direct implication of our findings is that, in interpreting the association between referral sourcing and well-fitting job candidate profiles "on paper," employers may want to consider that referrals can have access to resources that facilitate their self-presentation work. To the extent that firms want to mitigate this advantage associated with referral status, they could, for example, host pre-application resume preparation workshops open to *all* interested job candidates.

Second, the findings contribute to our understanding of the role of referral networks in providing labor-market advantage to job seekers (Barbulescu 2015, Kalleberg et al. 1996, Marsden 1994, Marsden and Campbell 1990, Sterling 2014, Yakubovic 2005). Going back to Granovetter's groundbreaking perspective on *The Strength of Weak Ties*, scholars have conceptualized the advantage that network ties provide as stemming from information about job opportunities and influence on hiring agents (Bian 1997,

Granovetter 1973, 1995, Lin et al. 1981, Marsden and Gorman 2001, Mouw 2003, Yakubovic 2005). Yet, the influence that connectors (i.e., referrers) exert on candidates' job-search behavior has received considerably less attention. Prior work has documented, for example, that having a friendship tie to a firm affects the likelihood that a candidate will accept a job offer and inform the firm of other, competing offers (Sterling 2014). Researchers have also speculated that having network ties to firms can help job seekers prepare to interact with firms in the recruitment process (Barbulescu 2015). However, our study is the first to provide direct evidence of how a referral tie to a firm affects candidates' self-presentation in applying for jobs. We thereby elucidate a novel mechanism contributing to a higher likelihood of successful employment matches in the presence of referral ties between job seekers and firms.

Third, our findings extend the literature on impression management and, more specifically, self-presentation in the labor market (Goffman, 1955; Kang et al., 2016). Extant work on impression management views the motivation to adopt self-presentation strategies as stemming from the goal relevance of impressions, the value of the desired goal, and the discrepancy between desired and current images (Bolino et al. 2016, Leary and Kowalski 1990). Recent research on self-presentation in the labor market has found evidence consistent with this model. For example, minority candidates' propensity to "whiten" their resumes by removing race signals decreases when target employers appear to value diversity more (Kang et al. 2016). Our study's findings expand our understanding of the factors that contribute to individuals' engagement in self-presentation strategies, highlighting the importance of social influence. We document that referral ties to target firms significantly influence the images job seekers display and the types of methods they use to create those images. Our study thus provides new insights into how and why individuals engage in efforts to manage the impressions of relevant audiences.

Finally, we contribute to the vibrant literature on misconduct in organizations, particularly on the role of networks in the diffusion of ethically liminal practices (e.g., Greve et al. 2010, Palmer and Moore 2016). Because the appropriateness and ethics of liminal practices are unclear, actors are likely influenced by network contacts in adopting such practices (Festinger 1954, Mohliver 2019). Distinguishing between right and wrong is uncertain and risky, motivating individuals to seek guidance from trusted others in

situations where ethical grey areas are at play. Our study extends these arguments to the labor market setting. Our findings suggest that referral ties are associated with less deviant self-presentation strategies, in spite of referral candidates' overall greater motivation to engage in self-presentation work.

At the same time, our study's design has limitations that suggest fruitful directions for future research. First, although candidate fixed-effects specifications help account for the unmeasured candidate heterogeneity associated with referrals, we cannot rule out entirely unmeasured job heterogeneity associated with referral status. However, it is difficult to envision a research design that could more fully rule out such unmeasured job heterogeneity using field-based data. It is therefore important to weigh this limitation against the strengths of the present design. First, the candidate-fixed effects specification provides important advantages in estimating the effects of referral ties on labor market outcomes (Yakubovic 2005; Obhukova and Lan 2013; Fernandez and Galperin 2014). Second, extensive controls account for the most obvious sources of between-job heterogeneity (e.g., geography, job level, job department), and our context focuses on a single, high-tech industry to limit between-industry heterogeneity in job characteristics. Finally, the survey findings "rule in" the posited mechanisms, implying that although job differences associated with referrals might play a role in candidates' self-presentation, these differences are not the sole explanation. To gain further insight into these mechanisms, future qualitative work can perhaps explore the interactions between job seekers and referrers in preparation for a job application and examine the transmission of motivation and assistance in greater detail.

Finally, the particularities of context and data studied are important considerations for the generalizability of the findings. First, our findings are pertinent to contexts like the Silicon Valley high-tech industry where employers tend to invest heavily in recruitment due to perceived talent shortages and high-skilled labor. This strong motivation to recruit may manifest in employers (or their contacts) reaching out to prospective candidates and offering referrals, as well as in these prospective referrers being motivated to assist candidates in preparing their resumes. The findings are likely less applicable in contexts where power dynamics in the labor market are less skewed in favor of workers, leading

candidates to struggle to get their contacts to refer them at all, let alone provide assistance with preparing their resumes (Smith 2005). While this limits somewhat the generalizability of our findings, our study nonetheless provides existence proof of the relationship between referral ties and self-presentation outcomes while also shedding light on a labor market that is, in itself, of substantive interest (e.g., Roach and Sauermann 2023). In terms of the data employed, we measured only the most obvious forms of resume tailoring, including changes in prior job titles and employers. Full resumes and other job-search materials include richer detail than we could capture here (e.g., cover letters, career objectives, descriptions of prior accomplishments and responsibilities). Because we focus only on self-presentation differences relating to some of the more objectively verifiable parts of candidates' resumes, our estimates of the effect of referrals in this setting are likely to be conservative. For example, if referrers convey more nuanced aspects of the ideal candidate profile the firm is seeking, candidates could then implement more nuanced adjustments to how they describe their past accomplishments and responsibilities. Thus, the influence of referral ties via transmission of inside information about a firm's detailed preferences might be more significant if these additional parts of the resume were considered.

In sum, the importance of referral networks in explaining the labor market prospects of job seekers is well-established. Referral networks transmit information about job opportunities and can influence hiring agents on behalf of job seekers. In addition, our study documents how referral networks also contribute to successful employment matches through their influence on job seekers' self-presentation. In essence, network ties contribute not only to hiring agents' favorable evaluations of job candidates but also to job candidates' more favorable self-presentation when interacting with prospective employers.

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Table 1. Summary Statistics of Dependent Variables

	(1)	(2)	(3)	(4)
		Standard deviation decomposition		
Variable	**Mean (SD)**	**Within**	**Between**	**Within/ Between**
Measures of screening outcomes				
-Job interviews	0.043 (0.203)	0.161	0.141	114.18%
Measures of person–job/organization fit				
-Horizontal fit	0.259 (0.163)	0.095	0.137	69.34%
-Vertical fit	0.237 (0.259)	0.078	0.249	31.33%
-Organizational fit	-0.070 (0.188)	0.036	0.178	20.22%
Number of observations	140,673			

Table 2. Summary Statistics of Control Variables

Variable	Mean (SD)
Application characteristics	
Number of resume entries (lagged)	4.976 (2.623)
Application number	3.320 (3.964)
Day of application	976.17 (330.079)
Local application	0.731 (0.443)
Current employer listed	0.741 (0.438)
Candidate characteristics	
Female candidate	0.337 (0.473)
Race	
Nonwhite	0.316
White	0.421
Race missing	0.262
Citizenship	
Not U.S. citizen/legal permanent resident	0.257
U.S. citizen/legal permanent resident	0.650
Citizenship missing	0.093
Years of education	
<16 years	0.050
16 years	0.392
>16 years	0.376
Education missing	0.182
Years of work experience	8.489 (6.964)
Years of management experience	4.372 (5.743)
Job characteristics associated with fit	
Baseline horizontal fit	0.255 (0.162)
Job level (0–5)	2.246 (1.126)
Job/firm characteristics	
Year job created	2011.235 (1.005)
Applications/job	426.691 (915.172)
Job department	
Sales	0.096
IT/engineering	0.355
Production/operations	0.141
Marketing	0.166
Client service	0.087
HR	0.034
Administration	0.083
Other	0.038
Number of employees	
≤10	
11–50	0.143
51–150	0.543
>150	0.291
U.S. work authorization required	0.254 (0.435)
Number of observations	140,673

Table 3. Linear Probability Models of Interview

	(1)	(2)	(3)
Horizontal fit	**0.042*****	**0.042*****	**0.039*****
	(0.003)	**(0.004)**	**(0.006)**
Vertical fit	**0.028*****	**0.032*****	**0.037*****
	(0.002)	**(0.003)**	**(0.009)**
Organizational fit	**0.013*****	**0.016*****	**0.017***
	(0.002)	**(0.002)**	**(0.010)**
Referral	0.019***	0.005***	0.007***
	(0.001)	(0.001)	(0.001)
Number of resume entries	0.001***	0.001***	0.001
	(0.000)	(0.000)	(0.001)
Application number	0.000***	-0.002***	-0.001***
	(0.000)	(0.000)	(0.000)
Local application	0.020***	0.015***	0.019***
	(0.001)	(0.001)	(0.003)
Current employer listed	0.005***	0.001	-0.005
	(0.001)	(0.001)	(0.003)
Year job created	-0.009***	0.000	0.005***
	(0.001)	(0.001)	(0.001)
Day of application	0.000***	0.000***	-0.000
	(0.000)	(0.000)	(0.000)
Controls for time-invariant candidate characteristics	Yes	Yes	-
Controls for firm/job characteristics	Yes	Yes	Yes
Functional area dummies	Yes	Yes	Yes
Job level and firm size dummies	Yes	Yes	Yes
Three-digit ZIP code dummies	Yes	Yes	Yes
Candidate fixed effects	No	No	Yes
Constant	0.107***	0.065***	0.016
	(0.005)	(0.007)	(0.010)
Number of observations	462,053	140,673	140,673

Note. Robust standard errors clustered by candidate appear in parentheses.
*p < 0.10; **p < 0.05; ***p < 0.001.

Table 4. Ordinary Least Squares Models of Fit (Continues on next page)

Variable	(1) Horizontal fit	(2) Vertical fit	(3) Organizational fit	(4) Horizontal fit	(5) Vertical fit	(6) Organizational fit
Referral	**0.008*** **	**0.007*** **	**0.003*** **	**0.003*** **	**0.001***	**0.002*** **
	(0.001)	**(0.001)**	**(0.001)**	**(0.000)**	**(0.001)**	**(0.000)**
Baseline horizontal fit				0.939***		
				(0.003)		
Number of resume entries	-0.004***	-0.005***	0.001***	-0.005***	-0.007***	0.006***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Application number	-0.000	-0.000***	-0.000***	0.000	-0.000	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Local application	0.009***	0.006***	0.010***	0.003**	-0.000	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Current employer listed	-0.017***	-0.007***	0.014***	-0.008***	-0.003	0.004*
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Year job created	0.003***	-0.000	-0.001**	0.000	0.002***	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Log (Number of applications/job)	0.002***	-0.002***	-0.002***	0.000**	0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Day of application	-0.000***	-0.000*	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Job requires U.S. work authorization	-0.002**	-0.003***	0.006***	-0.001**	-0.000	0.001**
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)

Note. Robust standard errors clustered by candidate appear in parentheses.

* $p < 0.10$; **$p < 0.05$; ***$p < 0.001$.

Table 4. Ordinary Least Squares Models of Fit (Continued)

Variable	(1) Horizontal fit	(2) Vertical fit	(3) Organizational fit	(4) Horizontal fit	(5) Vertical fit	(6) Organizational fit
Firm size (ref. = ≤10 employees)						
11–50 employees	0.010***	-0.000	-0.000	0.000	0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
51–150 employees	0.004***	-0.001	-0.001	-0.000	-0.003***	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
>150 employees	0.008***	-0.004**	-0.003*	-0.000	-0.005**	-0.000
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Job level (ref. = entry level)						
Internship	0.006***	-0.020***	-0.037***	-0.001	-0.003	-0.015***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)
Midlevel	0.030***	0.107***	-0.003***	0.003***	0.086***	0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)
Experienced	0.036***	0.122***	0.002**	0.002***	0.086***	0.001**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Manager	0.038***	0.322***	0.002*	0.002**	0.274***	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.000)
Executive	0.021***	0.368***	0.005***	0.003**	0.300***	0.002**
	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)
Functional area dummies	Yes	Yes	Yes	Yes	Yes	Yes
Three-digit ZIP code dummies	Yes	Yes	Yes	Yes	Yes	Yes
Controls for candidate characteristics	Yes	Yes	Yes	—	—	—
Candidate fixed effects	No	No	No	Yes	Yes	Yes
Constant	0.198***	0.046***	-0.055***	0.015***	0.158***	-0.116***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.006)	(0.006)
Number of observations	462,053	462,053	462,053	140,673	140,673	140,673

Note. Robust standard errors clustered by candidate appear in parentheses. *$p < 0.10$; **$p < 0.05$; ***$p < 0.001$

Table 5. Ordinary Least Squares Models of Fit

Variables	(1) Horizontal fit	(2) Vertical fit	(3) Organizational fit	(4) Horizontal fit	(5) Vertical fit	(6) Organizational fit
Resume changes:						
-Employer changes	-0.001	0.003	0.005**			
	(0.003)	(0.002)	(0.002)			
-Job-title changes	0.010***	0.004**	-0.001			
	(0.002)	(0.002)	(0.002)			
-Resume additions	0.006***	-0.001	0.013***			
	(0.002)	(0.002)	(0.002)			
-Resume deletions	0.005**	0.007***	-0.002			
	(0.002)	(0.002)	(0.002)			
Resume changes (all)				-0.003	-0.003	0.001
				(0.004)	(0.004)	(0.003)
Referral	0.003**	0.002*	0.000	0.001	0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Referral × Resume changes				0.014***	0.009**	0.007**
				(0.004)	(0.004)	(0.004)
Constant	-0.000	0.130***	-0.116***	0.002	0.130***	-0.114***
	(0.005)	(0.007)	(0.007)	(0.005)	(0.007)	(0.007)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Functional area dummies	Yes	Yes	Yes	Yes	Yes	Yes
Three-digit ZIP code dummies	Yes	Yes	Yes	Yes	Yes	Yes
Candidate fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	90,779	90,779	90,779	90,779	90,779	90,779

Note. Robust standard errors clustered by candidate appear in parentheses.

*$p < 0.10$; **$p < 0.05$; ***$p < 0.001$.

Table 6. Relationship Between Referrals, Resume Changes, and Fit Stratified by Job Seekers' Experience

Variables	Horizontal fit		Vertical fit		Organizational fit	
	(1)	(2)	(3)	(4)	(5)	(6)
	Inexperienced candidates	Experienced candidates	Inexperienced candidates	Experienced candidates	Inexperienced candidates	Experienced candidates
Referral	0.000	0.001	-0.001	0.001	-0.001	-0.000
	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.000)
Resume changes	-0.006	0.002	-0.005	0.002	-0.000	0.001
	(0.006)	(0.004)	(0.005)	(0.006)	(0.006)	(0.003)
Referral × resume changes	0.020**	0.006	0.010**	0.004	0.013**	0.001
	(0.006)	(0.004)	(0.005)	(0.006)	(0.006)	(0.003)
Constant	-0.006	0.008	0.048***	0.191***	-0.182***	-0.042***
	(0.008)	(0.007)	(0.008)	(0.011)	(0.012)	(0.003)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Functional area dummies	Yes	Yes	Yes	Yes	Yes	Yes
Three-digit ZIP code dummies	Yes	Yes	Yes	Yes	Yes	Yes
Candidate fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	45,051	45,728	45,051	45,728	45,051	45,728

Notes. Robust standard errors clustered by candidate appear in parentheses.

$*p < 0.10$; $**p < 0.05$; $***p < 0.001$.

Figure 1. Examples of Resume Changes Impacting Perceived Fit

	Application to prior firm			**Application to current firm**		
Panel a. Change in horizontal fit						
Application date:	10/17/2011			11/11/2011		
Job applied to:	VP of Business Development			VP of Marketing		
Work experience presented:	**Start date**	**End date**		**Start date**	**End date**	
	1/1/2005	10/7/2011	**Vice President, Business Development & Innovation** Employer 1	1/1/2005	10/7/2011	**Vice President, Marketing & Innovation** Employer 1
Panel b. Change in vertical fit						
Application date:	1/23/2012			3/19/2012		
Title of job applied to:	Online Marketing Manager			e-Commerce Marketing Manager		
Level of job applied to:	Experienced (Level 2)			Executive (Level 4)		
Work experience presented:	**Start date**	**End date**		**Start date**	**End date**	
	11/1/2005	10/1/2007	**Technical Support Representative** Employer 3	11/1/2005	10/1/2007	**Business Development Manager** Employer 3
Panel c. Change in organizational fit						
Application date:	12/7/2010			2/8/2012		
Job applied to:	C/C++ Engineer			Director of Engineering		
Work experience presented:	**Start date**	**End date**		**Start date**	**End date**	
	6/1/1998	12/1/1998	Title 3a Employer 3 **India**	1/1/1997	1/1/1999	Title 3b Employer 3

Note: Employer names and unreferenced job titles are disguised to ensure anonymity. Relevant changes are underlined and bolded.

Figure 2. Survey Evidence on the Effect of Referral Ties on Job Candidates' Self-Presentation (N = 216)

A. Motivation Mechanisms
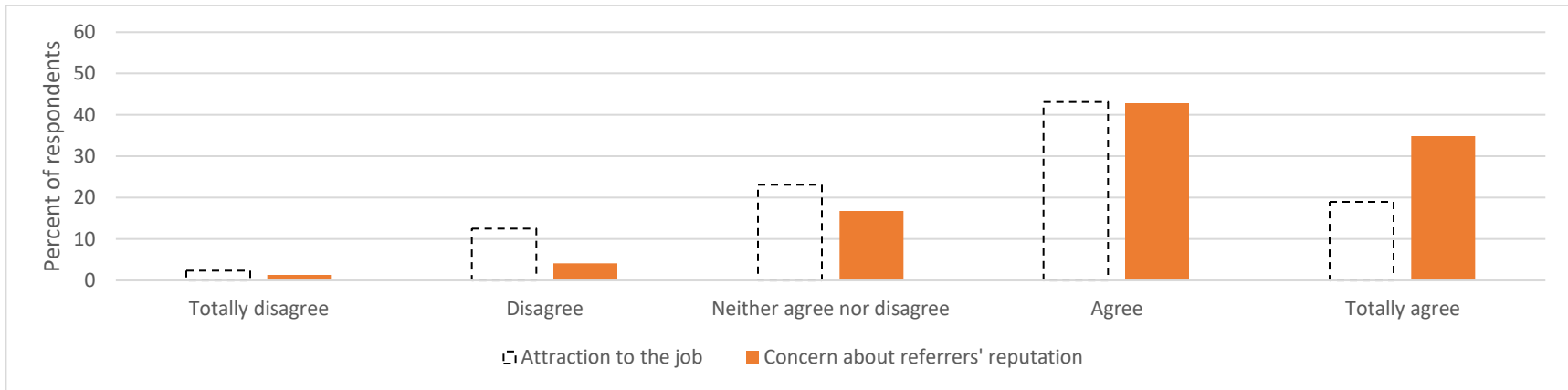
A. Assistance Mechanisms
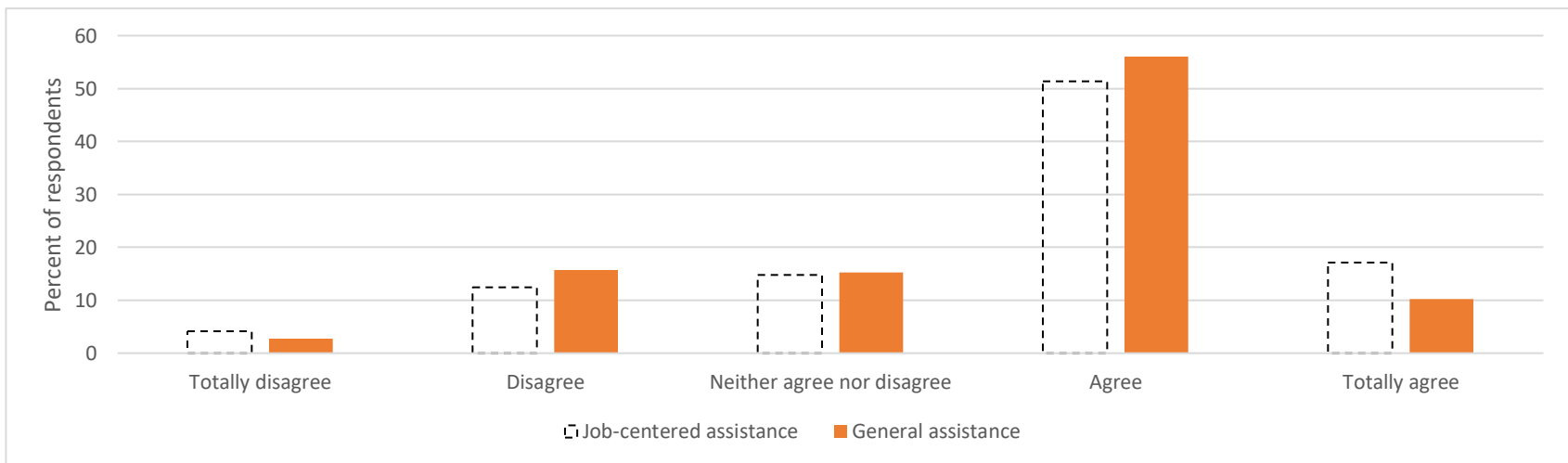
APPENDIX

Appendix 1. Alternative specifications of resume quality features

We considered alternative specifications of our resume quality and fit measures. We used the highest similarity/seniority/foreignness present in the resume rather than the average. For resume similarity, which is a continuous measure, we also used the standard deviation of similarity rather than the average. Appendix Table A.1. shows three models of the probability of interview as a function of average similarity/seniority/foreignness and controls (column 1), adding the highest value of these variables (column 2), and adding the standard deviation of similarity (column 3).

Appendix Table A.1. Effect of Alternative Specifications of Resume Quality Measures on Probability of Securing an Interview (linear probability models)

	(1)	**(2)**	**(3)**
Average job title similarity	0.039***	0.034***	0.033***
	(0.006)	(0.011)	(0.007)
Average job title seniority	0.021**	0.027**	0.021**
	(0.010)	(0.012)	(0.010)
Average resume foreignness	-0.014	-0.018	-0.013
	(0.010)	(0.014)	(0.010)
Highest job title similarity		0.004	
		(0.006)	
Highest job title seniority		-0.006	
		(0.007)	
Highest resume foreignness		0.003	
		(0.010)	
Standard deviation of job title similarity			0.014
			(0.009)
Referral	0.007***	0.007***	0.007***
	(0.001)	(0.001)	(0.001)
Number of resume entries	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)
Application number	-0.000**	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)
Local application	0.019***	0.019***	0.019***
	(0.003)	(0.003)	(0.003)
Year job created	0.007***	0.007***	0.007***
	(0.001)	(0.001)	(0.001)
Number of applications/job	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)
Functional area dummies	Yes	Yes	Yes
Job level and firm size dummies	Yes	Yes	Yes
Three-digit ZIP code dummies	Yes	Yes	Yes
Candidate fixed effects	Yes	Yes	Yes
Constant	-0.032***	-0.031***	-0.032***
	(0.009)	(0.009)	(0.009)
Number of observations	144,301	144,301	144,301

Note: Robust standard errors clustered by candidate appear in parentheses.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

Appendix Table A2. Correlation coefficients

A. Correlations between resume quality features and control variables (N = 144,301)

	Referral	Job title similarity	Job title seniority	Resume foreignness	Number of resume entries	Female	Nonwhite	Race missing	Citizenship
Referral	1								
Job title similarity	0.0172*	1							
Job title seniority	0.0284*	0.1408*	1						
Resume foreignness	-0.0182*	0.0105*	-0.1658*	1					
Number of resume entries	0.0204*	-0.0381*	0.2019*	-0.1303*	1				
Female	-0.0012	0.0312*	-0.0555*	0.0061*	-0.0326*	1			
Nonwhite	0.0098*	0.0006	-0.2236*	0.1740*	-0.1691*	0.0312*	1		
Race missing	-0.0138*	0.0011	0.0104*	-0.0267*	0.0546*	-0.0193*	-0.5168*	1	
Citizenship	-0.0136*	-0.0203*	0.2153*	-0.2465*	0.1812*	0.0277*	-0.3233*	0.2292*	1
Local candidate	0.0202*	0.0411*	0.1178*	-0.1369*	0.1074*	0.1285*	-0.0649*	0.0467*	0.1686*
Years of education	0.0342*	0.0222*	-0.0154*	0.0586*	0.0107*	-0.0560*	0.0407*	-0.0016	-0.1162*
Years of work experience	0.0033	0.0525*	0.4543*	-0.1749*	0.4684*	-0.0780*	-0.2425*	0.0235*	0.2413*
Years of management experience	0.0284*	0.0503*	0.5924*	-0.1584*	0.3035*	-0.0581*	-0.2126*	-0.0252*	0.1819*
Application number	0.1611*	-0.0021	-0.003	0.0038	0.0386*	-0.0502*	0.0153*	0.0364*	0.0018
Year job created	0.2234*	-0.0284*	0.1051*	-0.0862*	0.0513*	0.0647*	-0.0708*	-0.0068*	0.1061*
Applications/job	-0.1013*	0.0187*	-0.1645*	0.1221*	-0.1246*	-0.0129*	0.1101*	-0.0322*	-0.1308*
Job level	0.0242*	0.0646*	0.3329*	-0.0967*	0.2022*	-0.0923*	-0.1439*	0.0395*	0.1069*
Job department	0.0189*	-0.0122*	0.1067*	-0.1416*	0.0471*	0.2401*	-0.0640*	-0.0204*	0.1651*
Firm size	-0.0183*	0.0071*	0.0376*	-0.0272*	0.0084*	0.0402*	-0.0134*	-0.0055*	0.0313*

*$p < 0.05$.

A. Correlations between resume quality features and control variables (N = 144,301) – Continued

	Local candidate	Years of education	Years of work experience	Years of management experience	Application number	Year job created	Applications/job	Job level	Job department	Firm size
Local candidate	1									
Years of education	-0.0921*	1								
Years of work experience	0.1376*	-0.0232*	1							
Years of management experience	0.0738*	0.0080*	0.6986*	1						
Application number	0.0128*	0.0275*	-0.0205*	-0.0265*	1					
Year job created	0.0264*	-0.0210*	0.1028*	0.1210*	0.0863*	1				
Applications/job	-0.1197*	0.0155*	-0.1646*	-0.1471*	-0.0639*	-0.2774*	1			
Job level	0.0315*	0.0564*	0.3314*	0.3828*	0.0376*	0.0486*	-0.2684*	1		
Job department	0.1511*	-0.1103*	0.0949*	0.1343*	-0.0628*	0.2100*	-0.1261*	-0.0184*	1	
Firm size	0.0219*	-0.0304*	0.0369*	0.0434*	-0.0220*	0.0023	-0.0063*	0.0293*	0.0180*	1

*$p < 0.05$.

B. Correlations between resume changes and control variables (N = 94,648)

	Referral	Job title changes	Resume entry additions	Resume entry deletions	Employer change	Number of resume entries	Female	Nonwhite	Race missing
Referral	1								
Job title changes	0.0369*	1							
Resume entry additions	0.0778*	0.2239*	1						
Resume entry deletions	0.0434*	0.2416*	0.5229*	1					
Employer change	0.0227*	0.1385*	0.2051*	0.2572*	1				
Number of resume entries	0.0002	0.0184*	0.0504*	-0.0211*	0.0493*	1			
Female	0.0287*	0.0125*	0.0145*	0.0133*	0.001	-0.0362*	1		
Nonwhite	-0.0014	-0.0064	-0.0002	-0.0054	-0.0094*	-0.1780*	0.0296*	1	
Race missing	-0.0230*	-0.0053	-0.0182*	-0.0071*	-0.005	0.0582*	-0.0188*	-0.5229*	1
Citizenship	0.0135*	0.0122*	-0.0019	0.0014	0.0025	0.1941*	0.0237*	-0.3329*	0.2317*
Local candidate	-0.0130*	0.0107*	0.0195*	0.0112*	0.0100*	0.1083*	0.1226*	-0.0629*	0.0413*
Years of education	0.0119*	0.0183*	0.0220*	0.0340*	0.0138*	0.0043	-0.0517*	0.0457*	-0.0045
Years of work experience	0.0177*	-0.0011	-0.0452*	-0.0119*	-0.0021	0.4681*	-0.0811*	-0.2550*	0.0306*
Years of management experience	0.0571*	0.0197*	-0.0143*	-0.0007	0.0103*	0.3014*	-0.0613*	-0.2187*	-0.0246*
Application number	0.0233*	-0.0190*	-0.0446*	-0.0303*	-0.0228*	0.0420*	-0.0562*	0.0108*	0.0483*
Year job created	0.1140*	0.0130*	0.0451*	0.0153*	0.0074*	0.0695*	0.0664*	-0.0893*	-0.0008
Applications/job	-0.0153*	-0.0077*	-0.0005	-0.0016	-0.0041	-0.1014*	0.0041	0.0887*	-0.0270*
Job level	-0.0114*	0.0087*	-0.0037	-0.0063	0.0011	0.1912*	-0.0948*	-0.1343*	0.0406*
Job department	0.0865*	0.0294*	0.0322*	0.0234*	0.0190*	0.0509*	0.2325*	-0.0677*	-0.0232*
Firm size	-0.0046	0.0100*	0.0000	0.0017	-0.0055	0.0038	0.0268*	-0.0141*	-0.0032

*$p < 0.05$.

B. Correlations between resume changes and control variables (N = 94,648) – Continued

	Citizenship	Local candidate	Years of education	Years of work experience	Years of management experience	Application number	Year job created	Applications/job	Job level	Job department
Citizenship	1									
Local candidate	0.1610*	1								
Years of education	-0.1217*	-0.0897*	1							
Years of work experience	0.2559*	0.1326*	-0.0363*	1						
Years of management experience	0.1929*	0.0713*	0.0022	0.6973*	1					
Application number	0.0152*	0.0069*	0.0229*	-0.0229*	-0.0331*	1				
Year job created	0.1273*	0.0293*	-0.0409*	0.1296*	0.1468*	0.0389*	1			
Applications/job	-0.0977*	-0.0638*	0.0063	-0.1380*	-0.1267*	-0.0524*	-0.2803*	1		
Job level	0.0973*	0.0172*	0.0597*	0.3161*	0.3746*	0.0364*	0.0563*	-0.2263*	1	
Job department	0.1667*	0.1389*	-0.1057*	0.1043*	0.1486*	-0.0705*	0.2302*	-0.0885*	-0.0292*	1
Firm size	0.0260*	0.0121*	-0.0246*	0.0345*	0.0432*	-0.0244*	0.0012	0.0110*	0.0187*	0.0085*

$*p < 0.05$.

Appendix Table A.3. Mediation analysis: Direct, indirect, and total effects (based on model in Table 5, column 4)

	Estimate	Standard error	*p*-value	95% confidence interval	
Natural direct effect	0.0066***	0.0011	0.000	0.0044	0.0088
Natural indirect effect	0.0003***	0.0001	0.002	0.0001	0.0005
Total effect	0.0069***	0.0011	0.000	0.0047	0.0091

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

Appendix Table A.4. Analyses of Conditions Moderating the Effect of Resume Seniority

Variable	Seniority		Interviews	
	(1)	**(2)**	**(3)**	**(4)**
Referral	0.002**	0.003**	0.019***	0.018***
	(0.001)	(0.001)	(0.001)	(0.001)
Job level (ref. = entry level)				
Internship	0.007***	0.002	0.007***	0.005**
	(0.002)	(0.001)	(0.002)	(0.002)
Mid-level/experienced	0.001	0.002***	-0.005***	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Manager/executive	-0.001	0.001	-0.015***	-0.005***
	(0.002)	(0.001)	(0.002)	(0.001)
Referral × Internship	-0.008***			
	(0.002)			
Referral × Mid-level/experienced	0.001			
	(0.001)			
Referral × Manager/executive	0.003*			
	(0.002)			
Firm size (ref. = ≤10 employees or <150 employees)[a]				
11–50 employees	0.000	0.001	0.004***	
	(0.001)	(0.001)	(0.001)	
51–150 employees	0.001	-0.000	0.019***	
	(0.001)	(0.002)	(0.001)	
>150 employees	0.002	-0.004	0.014***	0.003
	(0.002)	(0.003)	(0.002)	(0.002)
Referral × 11–50 employees		-0.002		
		(0.002)		
Referral × 51–150		0.001		
		(0.002)		
Referral × >150		0.009**		
		(0.003)		
Job title seniority			0.002	0.016***
			(0.003)	(0.002)
Job title seniority × Internship			-0.026***	
			(0.007)	
Job title seniority × Mid-level/experienced			0.018***	
			(0.003)	
Job title seniority × Manager/executive			0.026***	
			(0.004)	
Job title seniority × >150 employees				0.009**
				(0.004)
Controls	Yes	Yes	Yes	Yes
Functional area dummies	Yes	Yes	Yes	Yes
Job level and firm size dummies	Yes	Yes	Yes	Yes
Three-digit ZIP code dummies	Yes	Yes	Yes	Yes
Controls for candidate characteristics	-	-	Yes	Yes
Candidate fixed effects	Yes	Yes	No	No
Constant	0.358***	0.357***	0.010***	0.008***
	(0.007)	(0.007)	(0.003)	(0.003)
Number of observations	144,301	144,301	498,786	498,786

Note. Robust standard errors clustered by candidate appear in parentheses.

[a] The omitted category is ≤10 for Models 1–3 and <150 for Model 4.

*p < 0.10; **p < 0.05; ***p < 0.01.

Appendix Table A.5. Survey Sample Characteristics

	Mean
Highest education	
Undergraduate degree (BA/BSc/other)	0.70
Graduate degree (MA/MS/MPhil/other)	0.26
Doctorate degree (PhD/other)	0.05
Industry of employment	
Computers and electronics manufacturing	0.09
Information services and data processing	0.32
Scientific or technical services	0.20
Software	0.25
Telecommunications	0.06
Video games	0.02
Other information industry	0.07
Role	
Manager	0.70
Trained professional	0.30
Demographic characteristics	
Female	0.22
Nonwhite (0 = white)	0.32
Age	36.77
Approximate annual income (in 2000 USD)	112.69