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Race and Networks in the Job Search Process

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Abstract

Racial disparities persist throughout the employment process, with African Americans experiencing significant barriers compared to whites. This article advances the understanding of racial labor market stratification by bringing new theoretical insights and original data to bear on the ways social networks shape racial disparities in employment opportunities. We develop and articulate two pathways through which networks may perpetuate racial inequality in the labor market: *network access* and *network returns*. In the first case, African American job seekers may receive fewer job leads through their social networks than white job seekers, limiting their access to employment opportunities. In the second case, black and white job seekers may utilize their social networks at similar rates, but their networks may differ in effectiveness. Our data, with detailed information about both job applications and job offers, provide the unique ability to adjudicate between these processes. We find evidence that black and white job seekers utilize their networks at similar rates, but network-based methods are less likely to lead to job offers for African Americans. We then theoretically develop and empirically test two mechanisms that may explain these differential returns: *network placement* and *network mobilization*. We conclude by discussing the implications of these findings for scholarship on racial stratification and social networks in the job search process.

Keywords

race, social networks, labor markets, inequality

Racial disparities in the labor market remain large and durable. While the role of persistent racial discrimination in hiring has been well-documented (Bertrand and Mullainathan 2004; Pager, Western, and Bonikowski 2009), barriers to access often emerge through less direct and more informal channels that can precede, supplant, or shape formal hiring decisions. Job opportunities are often filled without any formal hiring process (Waldinger and Lichter 2003) and, even when such a process exists, the influence of social connections can still be strong (Fernandez, Castilla, and Moore 2000; Granovetter 1973). Indeed, reflecting on the importance of social networks in shaping racial disparities in the labor market, Loury (2001:452) refers to the shift from "discrimination in contract" to "discrimination in contact." According to Loury (2001), racial discrimination was once primarily characterized by explicit differences in treatment by race. By contrast, contemporary forms of discrimination are more likely supported

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in subtle ways by informal networks of opportunity. On its surface, the use of social networks appears race neutral, but patterns of social and economic segregation imply that their influence will consistently disadvantage members of historically marginalized groups. Building on this insight, we advance the understanding of racial labor market stratification by bringing new theoretical insights and data to bear on the ways race and the use of social networks in the job search process shape disparities in employment opportunities.

Network-based job search constitutes the informal search methods an individual may use when trying to find a job (e.g., family, friends, and acquaintances who provide information about a job lead), and it plays a central role in shaping labor market outcomes. Network-based search methods can influence labor market outcomes by providing job seekers with key resources as well as signaling information about a worker's quality to potential employers (Castilla, Lan, and Rissing 2013a). Existing estimates suggest that approximately half of all jobs are found through these informal search processes (see Corcoran, Datcher, and Duncan 1980), as opposed to formal job search methods such as online or newspaper job listings. Indeed, a significant body of scholarship has developed to examine how social networks shape labor market outcomes in a variety of ways (Castilla 2005; Fernandez et al. 2000; Granovetter 1973, 1974; Kmec 2006; Lin, Ensel, and Vaughn 1981; Mouw 2003; for reviews, see Castilla et al. 2013a, 2013b; Trimble and Kmec 2011).

How might social networks contribute to racial disparities during the job search process? The literature on race, social networks, and employment outcomes is vast, yet important issues remain unresolved. This article advances the literature in several key ways. First, we articulate an integrative theoretical statement on the role of networks in shaping racial inequality in the U.S. labor market, focusing on the perspective of the job seeker: the supply side of the labor market. Building on the important contributions of earlier work (Lin 2001; Royster 2003; Smith 2005), we bring together multiple strands of scholarship in this area to theoretically develop and empirically test a set of distinct pathways and mechanisms through which networks and race may intersect to produce labor market inequality. This type of theoretical integration has occurred from the perspective of the employer (Fernandez and Fernandez-Mateo 2006), but to our knowledge similar work has not taken place for understanding these processes from the perspective of the job seeker.

Second, we utilize original panel data from a national, probability-based sample of U.S. job seekers that contains detailed prospective information on the *applications* submitted by job seekers, regardless of whether they result in a job offer (drawing from nine interviews over an 18-month period). We therefore have empirical traction not available in much of the existing research in this area, which tends to either (1) focus on job incumbents, limiting analyses to the end of a search process and ignoring all job leads and applications that may not have resulted in an accepted offer, or (2) be based on cross-sectional data, which makes it difficult to isolate person-specific influences from the role of networks. In our data, respondents indicated, at the application level, through what search method they heard about an opening (e.g., network-based versus formal), whether a network alter mobilized resources on their behalf, whether they knew someone at the company to which they applied, and whether the application resulted in a job offer.[1] Thus, these data allow us to disentangle access to social networks from the effectiveness of those social networks in leading to job offers. We are also able to examine the mechanisms that may account for racial disparities in the returns to network search, distinguishing between the *availability* of contacts at a prospective employer and whether one's contacts play an *active role* in facilitating an application. To date, examining these fine-grained mechanisms has largely been the purview of qualitative research, case studies, or studies of a single racial or ethnic group (DiTomaso 2013; Royster 2003; Smith 2005), leaving open questions about their

generalizability and ability to explain racial variation in labor market outcomes.

Third, because we have information about multiple applications per respondent, these data allow us to observe variation in the use of search methods *for the same person*. Deploying a within-person approach for analyses focused on the returns to network-based search alleviates some of the key empirical challenges regarding selection bias that have plagued earlier research (see Mouw 2003). Thus, our analytic strategy that utilizes within-person estimates of the consequences of network-based search provides a more direct test of the connection between race, networks, and job outcomes.

This article proceeds as follows. First, we discuss the three key actors that are relevant for understanding networks and job search—the employer, the referrer, and the job seeker—and highlight the importance and contribution of our focus on the job seeker. We then theoretically develop the various pathways and mechanisms that may link networks, race, and disparities in employment outcomes. After discussing methodological challenges in existing scholarship in this area, we then introduce our data and methods and present our results. We conclude with a discussion of the implications of these findings for scholarship on job search and racial labor market inequality.

THREE KEY ACTORS: EMPLOYERS, REFERRERS, AND JOB SEEKERS

In the vast literature on network-based job search, three key actors come into focus: the employer, the referrer (or network alter), and the job seeker. Studies of employers ask: how might network referrals influence hiring decisions (Fernandez et al. 2000; Fernandez and Galperin 2014) and how might employers' reliance on referrals shape inequalities in the workplace (Fernandez and Sosa 2005)? This demand-side perspective provides insight into the information gains facilitated by referral-based hiring and the ways prevailing social homophily may further disadvantage historically excluded groups (for reviews, see Castilla et al. 2013a, 2013b; Marsden and Gorman 2001; Trimble and Kmec 2011). Empirically, these studies often focus on applications to a single firm, comparing the outcomes of referred and non-referred applicants in terms of their progress through the hiring process, their starting salaries, and even their performance after being hired (Castilla 2005; Fernandez et al. 2000; Fernandez and Sosa 2005). The positive employment outcomes enjoyed by referred candidates align with the notion that being referred signals something to the potential employer about a job applicant's underlying quality and potential productivity (Fernandez et al. 2000). At the same time, use of referrals as a key screening mechanism implies that members of groups not well represented within the firm may be excluded from important employment opportunities (see Reskin, McBrier, and Kmec 1999; Trimble and Kmec 2011; but see Rubineau and Fernandez 2013).

A second line of scholarship focuses on the referrer. In what contexts do individuals deploy their information or influence on behalf of others in their networks, and how do such decisions shape inequality? Smith (2005) provides compelling evidence that—in lower-income African American communities—individuals can be hesitant to make job referrals. Often unsure about their own employment security, potential referrers may be reluctant to put themselves at risk on behalf of another. Particularly when the job seekers in question have characteristics that make them an uncertain prospect, the risk to the referrer's reputation may feel too costly (Smith 2005; see also Marin 2012; Smith and Young 2017). Thus, the qualitative literature in this area provides compelling evidence that referrers—or potential referrers—are active agents in their own right, with network assistance being neither automatic nor consistent. Although continued work is needed in this area, these referrer processes likely have important implications for understanding the perpetuation of racial labor market inequality.

A third line of research—the scholarship with which we are directly in conversation—focuses on the supply side of the labor market with an emphasis on the workers themselves. This scholarship asks: how do job seekers find out about job opportunities and to what extent does the use of informal network ties shape their employment outcomes? Much of this research focuses on job incumbents, assessing retrospectively the processes by which they found their current positions (see, e.g., Granovetter 1974). This type of design, however, can raise questions about the causal standing of networks in promoting employment opportunities, due to the tendency of similar types of people to become affiliated with one another (Mouw 2003). It may therefore be the case that selection processes into network-based job search are what matter for workers' employment outcomes, rather than the social ties themselves.

Using a different approach, a more recent set of studies collects information about the search methods utilized by the same individual for multiple *applications* (Obukhova and Lan 2013; Yakubovich 2005). These studies generally find that the use of network-based search methods is associated with a higher likelihood of receiving job offers, after adjusting for time-invariant unobserved heterogeneity, providing evidence of a more direct role of social networks in improving employment outcomes. Yet, as we will discuss in more detail, the generalizability of some of these findings is unknown due to the contexts within which the data for these studies were collected. And, these within-person, supply-side designs have not examined the role of job seekers' race in shaping outcomes. Thus, unresolved questions remain in this literature that make it difficult to clearly identify the direct relationship between our key constructs of interest. The present study contributes primarily to research on job seekers—the supply side of the job search process—by examining how multiple pathways and mechanisms shape the connection between race, network-based search, and job outcomes.

RACE AND NETWORKS IN THE JOB SEARCH PROCESS: ACCESS AND RETURNS

We conceptualize two potential pathways through which social networks may be implicated in perpetuating racial disparities in the job search process. The first emphasizes racial differences in access to the information and resources that flow through social networks. We describe this pathway as *network access*. The second focuses on racial differences in the benefits that accrue to the use of social network resources. We describe this pathway as *network returns*. Together, these pathways constitute how black and white individuals may experience disparate employment opportunities due to their social networks.

The *network access* pathway builds on the work of Wilson (1987, 1996) and emphasizes the isolation of African Americans, particularly lower-income African Americans, with respect to contacts employed in the formal labor market (see Briggs 1998; Rankin and Quane 2000). Scholarship in this area generally argues that African Americans have smaller networks (Marsden 1987) or are less connected to social networks, particularly network alters who could assist in identifying or facilitating employment opportunities (Kasinitz and Rosenberg 1996; Tigges, Browne, and Green 1998). The empirical prediction from the *network access* argument is that black job seekers, compared to white job seekers, will have less access to network resources during their job search. In other words, they will be less likely to hear about specific job openings from network-based channels than from formal channels. Because network-based search is expected to be positively correlated with job offers, black job seekers will be disadvantaged in the labor market because of their lower levels of access to job leads provided by informal networks. As the upper-left component of Figure 1 demonstrates (Pathway 1), the *network access* argument predicts that network-based search

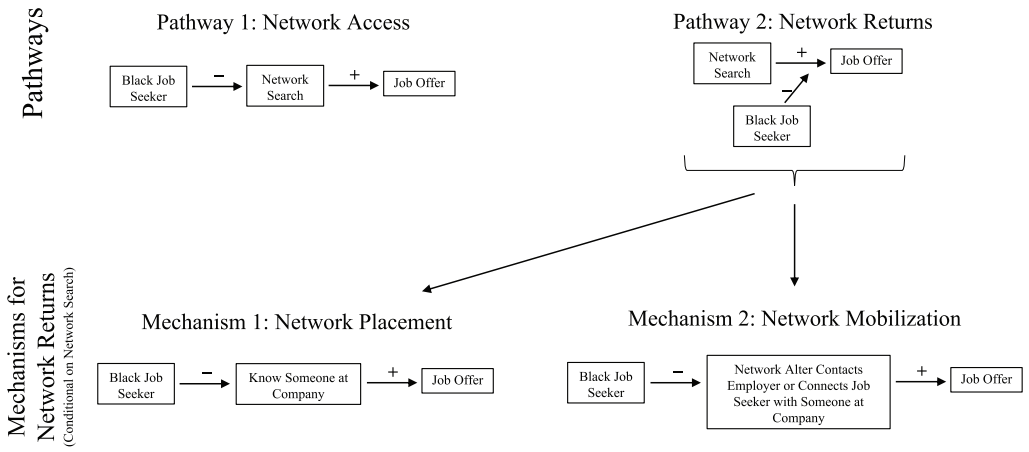

Figure 1. Theories of Race, Social Networks, and Job Search

will serve to mediate, or explain, the negative association between being African American and receiving job offers.

Some researchers, however, have questioned the extent of network isolation experienced by African Americans (Newman 1999; Oliver 1988). Indeed, existing empirical research suggests that minority job seekers are either equally likely or more likely than non-minorities to search and obtain their jobs through informal, network-based channels (Elliott 1999; Green, Tigges, and Diaz 1999; McDonald, Lin, and Ao 2009). Relatedly, McDonald (2011) finds that African American workers receive a similar number of unsolicited job leads as white men. Rather than arguing that minorities are cut off from social networks, this line of scholarship points to the idea that not all networks are created equal or behave in the same way (Smith 2005, 2007). According to this perspective, black and white job seekers differ not in their access to social networks, but rather in the benefits that accrue through those networks. We refer to this set of ideas as the *network returns* perspective. As we will discuss in the next section, the differential returns to social networks can operate through multiple mechanisms. Represented in the upper-right quadrant of Figure 1 (Pathway 2), the empirical prediction from this line of thought is that race will moderate the relationship between network-based search and job offers, with weaker labor market returns to network search for black job seekers.[2]

To date, disentangling these two potential pathways linking race, social networks, and labor market disparities—*network access* and *network returns*—has been empirically challenging. Discussing the literature in this area, Lin (2000:790) notes, "No studies have directly examined the effects of social capital on status attainment for blacks or other minority groups in the United States." Alongside the lack of empirical data, Lin (2000) notes that the *mechanisms* underlying return "deficits"—what we refer to as *network returns*—for racial minorities have been undertheorized and underdeveloped.[3] Some advances have been made in this literature in the intervening years (e.g., Royster 2003), but important questions remain. This article directly intervenes in the literature to address these gaps.

THE MECHANISMS OF DIFFERENTIAL NETWORK RETURNS: PLACEMENT AND MOBILIZATION

Much of the extant scholarship relevant to assessing the argument of differential *network returns* runs the risk of circular logic: minorities have less effective social networks if their network connections produce undesirable outcomes. To move beyond this type of reasoning,

we follow the call of Fernandez and Fernandez-Mateo (2006:43): "To give network accounts of minority underperformance analytical bite, we need to specify the mechanisms by which minorities are 'excluded' from productive networks." In other words, *why* might the networks of black job seekers be less effective than the networks of white job seekers in producing job offers? In the bottom half of Figure 1, we outline two key network-based mechanisms—*network placement* and *network mobilization*—that may systematically disadvantage African American job seekers relative to white job seekers, conditional on utilizing network search.

Network Placement

The placement of one's network ties in the broader social and economic order is important (see DiTomaso 2013; McDonald et al. 2009). For example, existing research suggests there are significant financial benefits to having well-placed contacts, such as individuals with hiring authority (Kmec and Trimble 2009) and individuals at the organization to which one is applying (Fernandez and Greenberg 2013). Racial differences in the network placement or social position of job seekers' social contacts may influence the effectiveness of those contacts (McGuire 2000). Additionally, strategically placed social ties may provide job seekers with tacit, informal knowledge about the companies and jobs to which they are applying. To the extent that black job seekers' network ties are less well represented in formal employment, clustered in less desirable types of workplaces, or unemployed altogether (Bureau of Labor Statistics 2017), African Americans' social ties may be less likely to occupy positions where they could be of maximum assistance during the job search process. We refer to this potential mechanism as *network placement*, which is represented in the bottom-left part of Figure 1 (Mechanism 1).[4]

One key piece of the existing evidence assessing this proposition fails to find strong support for the influence of network placement. Green and colleagues (1999), for example, found that, among black and white job seekers who found their job through the help of another person, there were no racial differences in whether that person was employed at the firm. In their study, for 68.2 percent of white respondents and 68.7 percent of black respondents, the person who assisted them in getting their job was a current employee of the firm. Yet, these estimates may not capture the complete picture because they include only job applications that led to job offers and eventual employment. A great deal of job search activity—whether using formal or network-based methods—does not result in a job offer. Without information on the fuller landscape of job search, it is possible to form an incomplete or potentially inaccurate view of total network returns. Our original survey data, discussed in more detail below, enables us to improve upon existing research in this area by examining both successful and unsuccessful applications.

Given broader processes of racial inequality in the labor market, we posit that, conditional on using network-based search methods for a particular job application, black job seekers will be less likely than white job seekers to know someone at the firm to which they apply for a job.[5] Even in cases where someone in an alter's social network may have told them about a job opening, black job seekers may be less likely than white job seekers to know someone at the employer where the vacancy exists. Therefore, insofar as knowing someone at the place to which one applies is positively related to receiving a job offer, network placement will serve to partially explain the black-white disparity in receiving job offers among network-based applications.

Network Mobilization

A second network-based mechanism that may disadvantage African American relative to white job seekers is *network mobilization* (McDonald 2011; Smith 2005). As noted earlier, potential referrers are often hesitant to mobilize resources or actually refer a job

candidate for a position (Marin 2012; Smith 2005; Smith and Young 2017). In other words, access to network alters and information is not equivalent to the mobilization of network-based resources.

Insofar as black job seekers' network connections are less likely to activate the resources at their disposal or to mobilize on the job seeker's behalf, this mechanism suggests racial disparities may emerge in network-based job search. Network alters can offer assistance in many ways, such as contacting an employer on the job seeker's behalf. This particular form of assistance, a key component of network mobilization, is likely to significantly increase the probability of receiving a job offer. For example, Royster's (2003) study of job search among graduates of a vocational training high school points to the importance of network mobilization. Even though black and white students had access to the same teachers with the same networks, the teachers selectively mobilized those informal channels in ways that yielded more tangible benefits for white students. Thus, even among black and white job seekers with similar levels and types of network ties, the returns to those networks may vary by race due to differential mobilization (Royster 2003).

The aforementioned literature finds evidence of black-white disparities in mobilization, but other studies have found different empirical patterns. For example, Green and colleagues (1999) present evidence that black and white workers who found their jobs through the assistance of another person were roughly equally likely to have had that person mobilize on their behalf. For 26.5 percent of white respondents and 25.0 percent of black respondents, the person who assisted them in finding their current (or most recent) job talked to the employer on their behalf (Green et al. 1999).

The mixed empirical evidence about the relevance of network mobilization for racial disparities is, again, in part due to the limitations of existing data. Small and restricted samples, and those based only on final job outcomes, may miss important factors that shape selection into network-based search and the returns to that search. The present study provides an opportunity to interrogate this mechanism more effectively. Our empirical prediction is that African American job seekers will be less likely than white job seekers to have their networks mobilize on their behalf, conditional on network search, and that this gap in mobilization will partially explain black-white disparities in the likelihood of an application leading to a job offer. The bottom-right component of Figure 1 depicts the *network mobilization* mechanism (Mechanism 2).

METHODOLOGICAL CONSIDERATIONS

Attempts to document the direct relationship between network search and employment opportunities have been plagued by empirical and methodological challenges (for useful summaries, see Mouw 2006; Obukhova and Lan 2013). In this section, we review the extant literature and discuss the strategies used to date to provide empirical tests of the direct link between social networks and job search outcomes that attempt to adjust for unobserved heterogeneity and selection processes.

Direct tests of the link between social networks and labor market attainment fall into two broad groups. The first set of studies focuses on job incumbents (i.e., individuals who are already employed) and then examines the relationship between how these people obtained their jobs and the quality of those jobs (e.g., wages). This line of research attempts to address questions such as, Do workers who obtained their jobs through network-based methods have higher or lower wages than workers who obtained their jobs through formal methods? The challenge with this line of scholarship, however, is that unsuccessful search efforts—including unsuccessful network-based search efforts—are not included in the analysis. This empirical limitation can lead to biased estimates of the association between informal search and labor market outcomes and raises questions

about whether networks actually affect labor market outcomes or whether the people who are able to access networks are already more privileged to begin with (Mouw 2003).

A second line of scholarship attempts to address these empirical and methodological issues by using strategies in line with Fernandez and Fernandez-Mateo's (2006:43) suggestion to "begin with samples of job seekers or job changers—as opposed to job incumbents—and examine the chances of obtaining employment for various search methods." Here, scholars turn to a *within-person* approach by examining individuals' successful *and* failed job search attempts that utilized different methods (e.g., formal and network search) (Obukhova and Lan 2013; Yakubovich 2005). These within-person comparisons—utilizing models with person-specific fixed effects—are powerful because they control for both observed *and unobserved* time-invariant individual-level characteristics that may affect an individual's use of network-based search and job search success. Unfortunately, data sources that enable within-person comparisons of job search are difficult to come by. We know of only a few existing studies that rely on this within-person approach, each with their own set of challenges for addressing the questions we are interested in exploring. In some cases, for example, the data points for individuals are measured years apart, straining the key assumption of within-person comparisons that unobserved individual-level characteristics do not change over time (Mouw 2002). In other cases, the research is limited to highly advantaged samples (Greenberg and Fernandez 2016; Obukhova and Lan 2013) or national contexts with distinct racial dynamics (Yakubovich 2005).

Our data, based on a national sample of U.S. job seekers, captures multiple applications submitted by an individual respondent within the same month, while also tracking respondents at up to nine points over an 18-month period. The unique structure of these data allows us to overcome many of the limitations of existing research. Having multiple observations per individual across multiple waves allows us to generate within-person estimates of network returns, addressing the problems of selection that plague research in this field. Furthermore, we are able to compare multiple applications submitted concurrently, reducing concerns about confounding due to time-varying unobserved heterogeneity. Thus, our estimate of the association between network-based search and job offers is able to more closely approximate a direct relationship. This approach helps reduce concerns about selection processes, but we note that our data do not include random or quasi-random assignment of network-based job applications. Finally, by capturing application-specific information about whether respondents knew someone at the companies to which they applied, and whether their networks mobilized on their behalf for a given job opening, we are able to empirically examine key mechanisms that may explain any racial disparities in the consequences of network search.

DATA AND METHODS

In this study, we draw on original panel data that follow a national sample of 2,060 job seekers over an 18-month period.[6] This data collection effort, which we call the National Longitudinal Study of Job Search (NLSJS), was conducted in collaboration with Gfk (formerly Knowledge Networks), a leading survey research company with a standing panel of respondents. The sampling design for the Gfk panel—referred to as KnowledgePanel—is based on a combination of random-digit dial (RDD) and address-based sampling (ABS) methods, with a sampling frame that covers approximately 97 percent of all U.S. households (Knowledge Networks 2011). The KnowledgePanel differs from many online panels in that it is *not* opt-in, and households without Internet access or a computer are still able to participate if they are selected at random for the panel. Gfk provides these household with free Internet access and a netbook computer. Gfk's panel

of respondents has been utilized by scholars across disciplines—including sociology, political science, and psychology—and findings from research using Gfk's panel have been published in leading social science journals (e.g., Bonikowski and DiMaggio 2016; Garfin, Holman, and Silver 2015; Nie et al. 2010; Rosenfeld and Thomas 2012).

The NLSJS consisted of nine survey waves conducted between February 2013 and November 2014. The first seven waves were conducted roughly six weeks apart over the course of approximately eight months. The eighth wave was conducted one year after the baseline, and the final survey (wave 9) took place six months later (roughly 18 months after the baseline survey).[7] The target population for the NLSJS was non-institutionalized adults ages 18 to 64 who were residing in the United States and who had looked for work over the previous four weeks.[8] The NLSJS oversampled black respondents to ensure there would be an adequate sample for statistical comparisons with white respondents.

To recruit participants for the NLSJS, Gfk sampled 19,509 of its KnowledgePanel members and sent email invitations to this group to screen them for eligibility. Of those 19,509 individuals, 11,231 (57.6 percent) completed the screening items. We screened individuals for eligibility on two items. First, the respondent had to provide informed consent. Second, the respondent had to have been looking for work in the four weeks prior to participating in the survey. Of the 11,231 respondents who completed the screening items, 2,092 (18.6 percent) were eligible to participate in the NLSJS. Of those eligible for participation, 2,060 (98.5 percent) completed the survey. Given that our central interest is in understanding black-white disparities in the use of and returns to informal job search, we limit our analysis to non-Hispanic white and non-Hispanic black respondents, resulting in a sample of 1,617 job seekers. Additionally, we note that our sample is limited to people who indicated they were actively searching for work at the baseline survey, which excludes individuals who may change jobs without actively searching.

The NLSJS collected detailed information about respondents' employment histories and job search behaviors, as well as demographic and background information. In addition, respondents were asked to provide information on (up to) the five most recent jobs they had applied to in the past four weeks, including detailed information on the search methods that led to each application.[9] Then, at that wave and each subsequent wave, respondents were asked whether each application they listed had resulted in a job offer.[10] Thus, we have detailed information about a large set of applications submitted by each respondent, the search method that led to each application, and whether each application resulted in a job offer.[11] Respondents in our sample applied to a broad array of occupations. The three most popular occupations were management (9.8 percent of applications), office and administrative support (18.3 percent), and sales and related (18.9 percent), but applications were submitted across a broad range of job types (see Table S1 in the online supplement for the distribution of occupations to which job seekers applied). Whether a given application resulted in a job offer is one of our key dependent variables; it is equal to "1" if the application resulted in a job offer and "0" otherwise.

One of the primary variables in our analysis is whether respondents heard about a given job opening through their social networks. For each application about which we collected information in the survey, respondents were asked: "How did you hear about the position with [Employer Name]?" They could then select from the following options: (1) family member, (2) friend, (3) acquaintance, (4) former employer/co-worker, (5) newspaper ad, (6) online or internet search, (7) employment agency, (8) help wanted sign, (9) contacted the employer directly, and (10) other, please specify. If the respondent selected family member, friend, acquaintance, or former employer/co-worker for a given application, that application was coded as utilizing "network search." If one of the other methods was selected—newspaper ad,

online or internet search, employment agency, help wanted sign, or contacting the employer directly—and none of the four network-based methods was selected, the application was coded as "formal/non-network search."[12] It is possible that job seekers in our survey were informed about an opening from someone in their network without directly asking that person for job leads. We classify this as part of the "network-based search" construct, although it does not necessarily imply active search for information in one's network. We utilize the "network-based search" variable as our key outcome variable—with race as the explanatory variable—when analyzing racial disparities in *network access*. This variable becomes our key explanatory variable—predicting job offers—when examining racial differences in *network returns*.

There are two key mechanisms underlying the *network returns* pathway that we seek to investigate empirically: *network placement* and *network mobilization*. We operationalize network placement with a survey item that asked respondents, regarding the company to which they submitted an application: "Do you know anyone who works at [Employer Name]?" If respondents answered "yes," they are coded as "1" on the network placement variable. If they answered "no," they are coded as "0" on this variable. We operationalize network mobilization by drawing on an item that asked respondents: "In addition to telling you about the job, did [network tie] do any of the following (please select all that apply)?" Respondents were then provided with six options: (1) provided information about the opening, (2) contacted the employer on your behalf, (3) put you in touch with a current employee at the company, (4) provided information about the company, (5) helped you prepare for the job interview, and (6) other, please specify. We conceptualize network mobilization as having two empirical dimensions: (1) contacting the employer on behalf of the job seeker, and (2) connecting the job seeker with someone at the company. We create separate binary measures—equal to "1" if the network alter mobilized in that way and "0" otherwise—for each of these dimensions. We analyze these two components of network mobilization separately in our analyses.

Analytic Strategy

Many of our key variables—job offers, network search, network mobilization, and network placement—are measured at the level of the application. Thus, for our analyses, the data are structured at the respondent-wave-application level, whereby applications are nested within waves and waves are nested within respondents. We utilize two types of models for our analysis. In some instances, we are able to estimate models that include respondent fixed effects. Including respondent fixed effects enables us to control for time-invariant observed and unobserved attributes of the respondent. We are able to estimate these models in the cases where we are interested in examining the association between two variables that vary *within* individual respondents. This is the case when we examine the relationship between network-based search and job offers. Including respondent-specific fixed effects, however, does not adjust for job seeker attributes that may vary over time or between applications. Thus, we include the following time-varying covariates in these models: the respondent's employment status at a given wave, whether the respondent did any work for pay over the past week, whether there were any job openings the respondent heard about but did not apply for, whether anyone in the respondent's household received money from non-wage sources over the previous four weeks (e.g., unemployment insurance), whether the respondent was still searching for work at the time of completing the survey, the number of job applications the respondent submitted over the previous four weeks, the occupation to which the respondent submitted an application (major SOC codes), whether the respondent heard about the job opening from both formal and network-based sources, whether respondents perceived the job they were

applying to as below their skill level, and an indicator variable for each survey wave.

When we are explicitly interested in black-white disparities for a given outcome, we utilize models with respondent-specific random effects. In these instances, we are not able to utilize models with respondent-specific fixed effects because respondents' racial classifications do not change over time in our data. In these random-effects models, we include controls for all the time-varying covariates in the fixed-effects models as well as key respondent characteristics that may be correlated with race, network-based search, and employment outcomes.[13] Specifically, the random-effects models adjust for the following sociodemographic attributes: gender, education, age (and age-squared), marital status, region, living in a metropolitan area, and having access to the internet. We also control for respondents' prior occupation (major SOC codes), number of months unemployed in the 24 months leading up to the baseline survey (measured as months since last job ended), and the number of waves the respondent participated in the survey. We also adjust for job seekers' experiences that may influence how they are treated by future employers and potential referrers—being fired from one's last job and having a criminal record—as well as owning a car, which can be a key resource for finding work.[14]

Throughout the analysis, our outcome variables are binary. There are well documented challenges, however, with interpreting interaction terms in logit models for binary outcomes (see Ai and Norton 2003; Mustillo, Lizardo, and McVeigh 2018), which we utilize in some of our analyses. Key proposed solutions to this challenge—such as utilizing marginal effects (Mize 2019)—can be additionally complicated when estimating within-respondent or fixed-effects models. Thus, we utilize linear probability models when estimating models that include interaction terms and respondent fixed effects. For consistency, we also present estimates from linear probability models with respondent random effects, but we note that using logistic regression models with random effects produces very similar results.[15] Table 1 presents descriptive statistics for our analytic sample. Our final analytic sample includes 13,643 applications nested within 1,389 job seekers.

RESULTS

The Two Pathways: Network Access and Network Returns

We begin our analysis by examining whether the network access or the network returns pathway more accurately describes the patterns in our data. First, we examine whether white job seekers are more likely than black job seekers to utilize network-based search methods, an empirical investigation of the *network access* pathway. Table 2 presents linear probability models with random effects where the outcome variable is whether the job seeker heard about a job opening through network-based methods. Model 1 in Table 2 does not include controls; Model 2 includes the full set of controls. In both models, the coefficient for being a black job seeker (compared to a white job seeker) is positive but not statistically significant. Thus, our data do not provide support for the *network access* pathway. Black and white job seekers hear about job openings through their social networks at similar rates.[16]

Next, we address whether the returns to network search vary by race (the *network returns* pathway). Table 3 examines whether an application results in a job offer as a function of the job seeker's race, search method (network versus formal), and the intersection of race and search method. These models include respondent-specific fixed effects, in essence comparing each individual in our dataset to him or herself and controlling for all time-invariant observable *and* unobservable characteristics of the job seeker. Table 3 presents three models of the returns to network-based search: first for white job seekers, then for black job seekers, and then for the pooled sample of white and black job seekers. Model 1 in Table 3, which is for white job seekers,

Table 1. Descriptive Statistics for Analytic Sample, by Race

	Full Sample	White Job Seekers	Black Job Seekers
Respondent Characteristics			
Woman	49.9%	45.8%	64.2%
Education			
Less Than High School	4.7%	4.1%	6.8%
High School	24.1%	25.5%	19.2%
Some College	33.4%	31.1%	41.7%
College Degree or Higher	37.8%	39.4%	32.3%
Age	41.4	41.7	40.4
Marital Status			
Married	44.1%	49.8%	23.8%
Widowed	1.5%	1.4%	2.0%
Divorced	11.4%	10.9%	13.0%
Separated	2.5%	1.9%	4.9%
Never Married	29.4%	25.7%	42.4%
Living with Partner	11.2%	10.4%	14.0%
Lives in Metro Area	86.0%	83.8%	93.8%
Has Internet	92.7%	93.6%	89.3%
Months Since Last Job Ended	4.4	4.1	5.6
Fired from Last Job	3.7%	3.1%	5.5%
Has a Criminal Record	9.1%	8.8%	10.1%
Owns a Car	87.2%	90.9%	73.9%
Sample Size	1,389	1,082	307
Respondent-Wave Characteristics			
Number of Applications Submitted	7.6	7.2	9.2
Not Employed at Wave	35.2%	34.2%	38.7%
Did Not Apply to Jobs Heard About	23.5%	24.7%	19.6%
Sample Size	4,662	3,613	1,049
Respondent-Wave-Application Characteristics			
Received Job Offer	7.5%	8.1%	5.6%
Used Network Search	23.2%	22.6%	24.8%
Position Below Skill Level	23.7%	23.9%	23.1%
Application both Network-Based and Formal	4.1%	4.1%	4.2%
Sample Size	13,643	10,328	3,315
Respondent-Wave-Application Characteristics (Conditional on Network Search)			
Network Placement: Knows Someone at Company	63.3%	65.8%	56.1%
Network Mobilization: Contacted Company	24.9%	26.7%	19.9%
Network Mobilization: Connected Job Seeker	17.6%	18.7%	14.5%
Sample Size	3,160	2,337	823

Source: NLSJS.
Note: Maximum sample size for each group of variables reported. Means reported for continuous variables.

indicates there is a large, positive, and statistically significant relationship between network search and job offers for white respondents. White job seekers are approximately 6 percentage points more likely to receive a job offer for an application using network-based methods than for an application using formal methods. Model 2 is

Table 2. Racial Differences in Social Network-Based Methods (Linear Probability Models with Respondent Random Effects)

	Job Lead from Social Network Methods	
	(1)	(2)
Black Job Seeker	.0188	.0218
	(.0187)	(.0195)
Woman Job Seeker		−.0333*
		(.0169)
Education (Less Than HS Is Omitted)		
High School		−.106*
		(.0449)
Some College		−.123**
		(.0445)
Bachelor's Degree or Higher		−.159***
		(.0461)
Age		−.0115*
		(.00473)
Age-Squared		.000129*
		(.0000557)
Marital Status (Married Is Omitted)		
Widowed		.00865
		(.0622)
Divorced		−.0250
		(.0253)
Separated		.0860
		(.0552)
Never Married		−.0159
		(.0214)
Living with Partner		.0469
		(.0290)
Lives in Metropolitan Area		−.0174
		(.0234)
Has Internet		−.0315
		(.0325)
Not Employed at Wave		−.00614
		(.0171)
Number of Jobs Applied To		−.000811**
		(.000248)
Did Not Apply to Jobs Heard About		−.0342**
		(.0119)
Position Below Skill Level		−.0240*
		(.0105)
Number of Waves in Survey		.00233
		(.00354)
Controls Included	no	yes
Constant	.263***	.703***
	(.00887)	(.124)
R-Squared	.0005	.0493
Number of Job Seekers	1,389	1,389
Number of Applications	13,643	13,643

Source: NLSJS.
Note: Clustered standard errors are in parentheses. Control variables not included in the table are prior occupation, occupation applied to, region, fired from last job, criminal record, owning a car, time since last job ended, worked for pay in previous week, alternative money sources, still looking for work, and the survey wave indicator variables.
*$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed tests).

Table 3. Relationship between Network Search and Receiving a Job Offer, by Race (Linear Probability Models with Respondent Fixed Effects)

	Job Offers		
	White Job Seekers	Black Job Seekers	Full Sample
	(1)	(2)	(3)
Network Search	.0617***	.0301*	.0622***
	(.0107)	(.0135)	(.0104)
Network Search × Black Job Seeker			−.0366*
			(.0161)
Number of Jobs Applied To	−.000168	−.000269	−.000183
	(.000158)	(.000280)	(.000135)
Not Employed at Wave	−.0353*	.00917	−.0230
	(.0156)	(.0179)	(.0124)
Position Below Skill Level	.00687	.00750	.00715
	(.00770)	(.0132)	(.00658)
Did Not Apply to Jobs Heard About	−.0171	−.0248	−.0200*
	(.0109)	(.0146)	(.00887)
Controls	yes	yes	yes
Constant	.241***	.0987**	.207***
	(.0247)	(.0314)	(.0203)
R-Squared	.0851	.0454	.0756
Number of Job Seekers	1,082	307	1,389
Number of Applications	10,328	3,315	13,643

Source: NLSJS.
Note: Clustered standard errors are in parentheses. Control variables not included in the table are occupation of job applied to, opening heard about from both formal and network-based channels, worked for pay last week, alternative money sources, still searching for work, and the survey wave indicator variables. All models include a control for "other" search method used. The indicator for being a black job seeker is not included in Model 3 because it is absorbed by the fixed effects.
*$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed tests).

subset to black job seekers. Here, we also find a positive and statistically significant association between network search and job offers for black respondents. Black job seekers are roughly 3 percentage points more likely to receive a job offer for a network-based application than for an application using formal search methods.

To test whether returns to network-based search are weaker for black than for white job seekers, we turn to Model 3. Model 3 shows the pooled sample of white and black respondents and includes an interaction between being black and using network-based search methods. The un-interacted "network search" coefficient, which estimates the relationship between network search and job offers for white respondents, is positive and statistically significant, as would be expected given the findings from Model 1. The interaction between being black and using network-based search is negative and statistically significant, providing evidence that the returns to network search are weaker for black than for white job seekers.[17] Indeed, the positive returns to network search are nearly twice the size for white respondents as they are for black respondents.[18] Thus, African American job seekers would need to utilize roughly twice as many network contacts as white job seekers to accrue the same labor market benefit. The magnitude of this relationship closely parallels findings from audit study research on racial discrimination in hiring that finds black job seekers need to apply to roughly twice as many jobs as white seekers

to receive the same number of interviews (Pager et al. 2009).

The evidence from Table 3 supports the idea that network-based job search is positively related to the probability of receiving a job offer for both white and black job seekers. But, this positive relationship is significantly weaker for black than for white job seekers. Thus, our data provide compelling empirical support for the *network returns* line of thought, rather than the *network access* conceptualization of how social ties may influence racial labor market disparities.

The Mechanisms of Network Returns: Network Placement and Network Mobilization

Next, we empirically examine two mechanisms that may assist in explaining why network search is less effective for black job seekers than for white job seekers. The first is *network placement*: the individuals in black job seekers' networks may be less strategically placed than the individuals in white job seekers' networks. We operationalize this concept through an item that asked respondents whether they knew someone at the company to which they were submitting their application. The second mechanism is *network mobilization*. Individuals in black job seekers' networks may be less likely to mobilize key resources on their behalf than individuals in white job seekers' networks. We operationalize this construct by utilizing a survey item that asked respondents, for each network-based application, whether someone in their network contacted the employer on their behalf or connected them with someone at the employer. We analyze these two types of network mobilization separately.

As a first step in exploring whether these two mechanisms can assist in explaining racial differences in network returns, we examine whether black job seekers are less likely to know someone at the employers to which they submit applications and, separately, whether they are less likely to have their networks mobilize on their behalf, among network-based applications. To examine these issues empirically, Table 4 estimates linear probability models with random effects where the primary explanatory variable is whether the job seeker is black (compared to white) and the outcome variables capture network placement and network mobilization. The odd-numbered models do not include controls. The even-numbered models include the full set of controls.

Models 1 and 2 in Table 4 examine the probability of knowing someone at the company to which the job seeker submitted an application. In both models, there is a negative and statistically significant coefficient for black job seekers. Predicted values from Model 2 indicate that, among network-based applications, white job seekers know someone at the company they apply to 65.2 percent of the time, compared to 56.3 percent for black job seekers. Next, Models 3 and 4 examine the first network mobilization outcome: connecting the job seeker with someone at the company. The model without controls finds a negative and statistically significant relationship between being black and having a network alter connect the job seeker with someone at the company, but the coefficient for being a black job seeker in the fully controlled model is not statistically significant at the .05 level. Models 5 and 6 examine whether a network alter contacted the company on the job seeker's behalf, the other network mobilization measure. In both models, the negative and statistically significant coefficient for being black indicates that black job seekers are less likely than white job seekers to have their networks contact a potential employer on their behalf. Indeed, the predicted values from Model 6 indicate that, among network-based applications, white job seekers have their network alters contact the employer on their behalf one-quarter of the time (25.4 percent), on average, compared to one-fifth of the time for black job seekers (20.0 percent).

The findings in Models 1 through 6 of Table 4 may be related to one another. If black job seekers are less likely to know someone at the companies they apply to, it may be more

Table 4. Racial Differences in Network Placement and Network Mobilization, Conditional on Network Search (Linear Probability Models with Respondent Random Effects)

	Network Placement: Knowing Someone		Mobilization: Connected Job Seeker with Company		Mobilization: Contacted Employer on Job Seeker's Behalf		Mobilization: Connected Job Seeker with Company (Conditional on Knowing Someone)		Mobilization: Contacted Employer on Job Seeker's Behalf (Conditional on Knowing Someone)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Black Job Seeker	−.110***	−.0890**	−.0471*	−.0386	−.0652**	−.0536*	−.0545*	−.0616	−.0598*	−.0729*
	(.0283)	(.0306)	(.0191)	(.0229)	(.0227)	(.0263)	(.0252)	(.0324)	(.0293)	(.0341)
Woman Job Seeker		.01000		.0105		.0300		.00761		.0330
		(.0277)		(.0211)		(.0236)		(.0282)		(.0302)
Education (Less Than HS Is Omitted)										
High School		.0699		−.0612		.0638		−.0129		.0631
		(.0516)		(.0421)		(.0427)		(.0507)		(.0600)
Some College		.0459		−.0498		.0705		.0149		.0679
		(.0501)		(.0413)		(.0430)		(.0492)		(.0610)
Bachelor's Degree or Higher		.0819		.0218		.110*		.0655		.0978
		(.0540)		(.0460)		(.0491)		(.0541)		(.0665)
Age		.0132		.00266		.00133		−.000406		−.00361
		(.00694)		(.00531)		(.00596)		(.00692)		(.00752)
Age-Squared		−.000156		−.0000550		−.0000251		−.0000220		.0000398
		(.0000825)		(.0000636)		(.0000713)		(.0000826)		(.0000905)
Marital Status (Married Is Omitted)										
Widowed		.137		.0333		−.0833		.0685		−.0557
		(.0934)		(.0909)		(.0760)		(.122)		(.0891)
Divorced		−.0224		−.0119		−.000412		−.0104		−.0111
		(.0386)		(.0296)		(.0366)		(.0378)		(.0474)
Separated		−.113		−.0118		−.0653		−.0303		−.0368
		(.0728)		(.0476)		(.0568)		(.0596)		(.0799)
Never Married		−.0274		.00566		−.00881		.0220		.0140
		(.0347)		(.0269)		(.0300)		(.0348)		(.0358)
Living with Partner		.0219		.0424		.0166		.0626		.0399
		(.0418)		(.0328)		(.0372)		(.0401)		(.0444)

(continued)

Table 4. *(continued)*

	Network Placement: Knowing Someone		Mobilization: Connected Job Seeker with Company		Mobilization: Contacted Employer on Job Seeker's Behalf		Mobilization: Connected Job Seeker with Company (Conditional on Knowing Someone)		Mobilization: Contacted Employer on Job Seeker's Behalf (Conditional on Knowing Someone)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Lives in Metropolitan Area		.0194		.0312		.0501		.0535		.0843*
		(.0355)		(.0255)		(.0287)		(.0312)		(.0363)
Has Internet		.00727		−.00781		.0401		.0249		.129**
		(.0460)		(.0332)		(.0387)		(.0404)		(.0476)
Not Employed at Wave		−.0143		−.0546		−.0533		−.0484		−.0509
		(.0323)		(.0292)		(.0307)		(.0371)		(.0399)
Number of Jobs Applied To		−.0000898		.000939		−.000778		.00122		−.00115
		(.000401)		(.000686)		(.000467)		(.00102)		(.000763)
Did Not Apply to Jobs Heard About		.0726**		.00202		.0108		.00686		.0219
		(.0229)		(.0213)		(.0247)		(.0256)		(.0298)
Position Below Skill Level		−.0238		.0197		.00556		.0289		.0130
		(.0223)		(.0205)		(.0208)		(.0278)		(.0284)
Number of Waves in Survey		−.0104		−.0114*		−.00756		−.00934		−.0100
		(.00599)		(.00505)		(.00533)		(.00627)		(.00678)
Controls Included	no	yes	no	yes	no	yes	no	yes	no	yes
Constant	.669***	.465*	.186***	.329*	.261***	.144	.214***	.250	.302***	.121
	(.0138)	(.181)	(.0109)	(.149)	(.0126)	(.146)	(.0133)	(.184)	(.0155)	(.184)
R-Squared	.0090	.0991	.0028	.0542	.0046	.0678	.0029	.0701	.0032	.0928
Number of Job Seekers	918	918	918	918	918	918	740	740	740	740
Number of Applications	3,160	3,160	3,160	3,160	3,160	3,160	1,999	1,999	1,999	1,999

Source: NLSJS.
Note: Clustered standard errors are in parentheses. Control variables not included in the table are prior occupation, occupation applied to, region, fired from last job, criminal record, owning a car, time since last job ended, worked for pay in previous week, opening heard about from both formal and network-based channels, alternative money sources, still looking for work, and the survey wave indicator variables. All models include a control for "other" search method used.
*$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed tests).

difficult for their networks to connect them with someone at the firm or contact the employer on their behalf. As a conservative test of the network mobilization argument, Models 7 through 10 investigate whether, conditional on knowing someone at the company to which they are applying, black job seekers' networks are less likely to mobilize on their behalf. Thus, Models 7 through 10 are subset to the network-based applications where the respondent actually knew someone at the company. Models 7 through 10 produce similar findings to Models 3 through 6. Thus, even in the "best case" scenario—where the job seeker knows someone who works at the company—black job seekers are less likely to have their network alters mobilize resources by contacting employers on their behalf.

Can racial differences in network placement and network mobilization assist in explaining racial disparities in job offers among network-based applications? To explore this possibility, we turn to the analyses in Table 5. Model 1 in Table 5 is a linear probability model with job-seeker random effects, including the full set of controls, examining the association between race and job offers among network-based applications. As the coefficient for being black indicates, African American job seekers are approximately five percentage points less likely than white job seekers to receive offers when applying for jobs heard about through their networks.

If network placement and network mobilization assist in explaining the racial gap in job offers for network-based applications, then adding these measures to Model 1 will attenuate the coefficient for black job seekers toward zero. In Models 2 through 4, we separately include each of the proposed mechanisms. However, our primary interest is in Model 5, which includes all three of the proposed mechanisms in the model simultaneously. Here, the coefficient for being a black job seeker attenuates from –.0495 in Model 1 to –.0398 in Model 5. This reduction in the coefficient for being black indicates that these measures of network placement and network mobilization assist in explaining just under 20 percent of the racial gap in job offers among opportunities identified through network ties.[19]

To more formally test whether the *network placement* and *network mobilization* mechanisms explain a statistically significant portion of the disparity in job offers between white and black job seekers among network-based search, we utilize two approaches. First, we use seemingly unrelated regression. We implemented linear probability models with clustered standard errors and the full set of controls utilized in Table 5.[20] We then compared the coefficient for being a black job seeker between (1) a model where none of the three measures of network placement and network mobilization were included, and (2) a model where all three measures of network placement and network mobilization were included. The difference between the two coefficients is statistically significant ($p < .05$), providing evidence that our proposed mechanisms assist in explaining the black-white job-offer gap for network-based search.

Second, we utilize the mediation framework proposed by Imai, Keele, and Tingley (2010) to test, separately, whether each of the three mechanism variables explains a statistically significant portion of the black-white job-offer gap among network-based applications.[21] Using Imai and colleagues' (2010) approach, we find that knowing someone at the company to which one is applying independently explains 9.1 percent of the black-white gap in job offers among network-based applications. Here, the mediation effect is statistically significant (ACME = –.0038, 95 percent CI = [–.0082, –.0005]). We also find that contacting the employer on the job seeker's behalf explains 15.5 percent of the black-white job-offer gap among network-based applications and the 95 percent confidence interval around the mediation effect does not include zero (ACME = –.0065, 95 percent CI = [–.0126, –.0014]). We do not, however, find evidence that connecting the job seeker with someone at the company plays a statistically significant mediating role. Together, this set of findings provides additional evidence that *network placement* and *network mobilization*—particularly contacting

Table 5. Racial Differences in Job Offers, Controlling for Network Placement and Network Mobilization (Linear Probability Models with Random Effects)

	Job Offers				
	(1)	(2)	(3)	(4)	(5)
Black Job Seeker	−.0495**	−.0457*	−.0464**	−.0444*	−.0398*
	(.0177)	(.0178)	(.0175)	(.0174)	(.0174)
Network Placement: Knowing Someone		.0418**			.0300*
		(.0136)			(.0136)
Mobilization: Connect with Company			.0791***		.0651***
			(.0199)		(.0196)
Mobilization: Contact Employer				.0922***	.0810***
				(.0169)	(.0167)
Woman Job Seeker	.0142	.0138	.0134	.0113	.0107
	(.0174)	(.0174)	(.0172)	(.0171)	(.0170)
Education (Less Than HS Is Omitted)					
High School	.0148	.0120	.0197	.00945	.0121
	(.0320)	(.0320)	(.0317)	(.0315)	(.0315)
Some College	.0293	.0275	.0333	.0233	.0260
	(.0314)	(.0315)	(.0310)	(.0309)	(.0308)
Bachelor's Degree or Higher	.0146	.0113	.0128	.00478	.00221
	(.0350)	(.0351)	(.0349)	(.0347)	(.0348)
Age	−.00433	−.00489	−.00457	−.00448	−.00503
	(.00427)	(.00425)	(.00420)	(.00421)	(.00416)
Age-Squared	.0000507	.0000573	.0000555	.0000536	.0000616
	(.0000518)	(.0000515)	(.0000512)	(.0000512)	(.0000506)
Marital Status (Married Is Omitted)					
Widowed	−.0552	−.0612	−.0577	−.0478	−.0552
	(.0424)	(.0411)	(.0444)	(.0430)	(.0442)
Divorced	.0321	.0330	.0330	.0323	.0337
	(.0260)	(.0259)	(.0259)	(.0256)	(.0255)
Separated	.0768	.0814	.0777	.0831	.0864*
	(.0446)	(.0446)	(.0434)	(.0425)	(.0418)
Never Married	−.0253	−.0240	−.0257	−.0244	−.0239
	(.0214)	(.0214)	(.0211)	(.0212)	(.0211)
Living with Partner	−.00666	−.00775	−.0100	−.00849	−.0118
	(.0272)	(.0271)	(.0270)	(.0270)	(.0269)

(continued)

Table 5. *(continued)*

	Job Offers				
	(1)	(2)	(3)	(4)	(5)
Lives in Metropolitan Area	.0345	.0337	.0320	.0299	.0279
	(.0188)	(.0188)	(.0188)	(.0187)	(.0187)
Has Internet	.0246	.0244	.0252	.0209	.0217
	(.0281)	(.0279)	(.0281)	(.0283)	(.0281)
Not Employed at Wave	−.0239	−.0231	−.0196	−.0190	−.0154
	(.0253)	(.0253)	(.0251)	(.0250)	(.0248)
Number of Jobs Applied To	−.000425	−.000420	−.000500	−.000364	−.000429
	(.000342)	(.000344)	(.000361)	(.000346)	(.000365)
Did Not Apply to Jobs Heard About	.0177	.0147	.0177	.0165	.0143
	(.0206)	(.0205)	(.0204)	(.0207)	(.0204)
Position Below Skill Level	−.00178	−.000796	−.00343	−.00282	−.00326
	(.0164)	(.0164)	(.0161)	(.0163)	(.0160)
Number of Waves in Survey	.00906*	.00948*	.00995*	.00967*	.0106**
	(.00393)	(.00392)	(.00393)	(.00387)	(.00388)
Controls Included	yes	yes	yes	yes	yes
Constant	.304**	.285*	.279*	.291**	.258*
	(.112)	(.111)	(.110)	(.111)	(.110)
R-Squared	.1477	.1508	.1565	.1603	.1676
Number of Job Seekers	918	918	918	918	918
Number of Applications	3,160	3,160	3,160	3,160	3,160

Source: NLSJS.
Note: Clustered standard errors are in parentheses. Control variables not included in the table are prior occupation, occupation applied to, region, fired from last job, criminal record, owning a car, time since last job ended, worked for pay in previous week, opening heard about from both formal and network-based channels, alternative money sources, still looking for work, and the survey wave indicator variables. All models include a control for "other" search method used.
*$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed tests).

someone at the company on the job seeker's behalf—assist in explaining a statistically significant portion of the racial gap in job offers among network-based job search.

ROBUSTNESS CHECKS

In this section, we examine the robustness of our findings to various analytic decisions. We focus on the findings regarding the differential returns to network-based search for white and black job seekers. Table 6 presents alternative ways of estimating the differential returns to network-based search. Models 1 and 2 present estimates from linear probability models with respondent random effects, rather than fixed effects. Model 1 does not include controls and Model 2 includes the full set of controls. The negative and statistically significant interaction between network-based search and being black in Models 1 and 2 demonstrates that returns to network-based search are weaker for African American respondents than for white respondents. And, the size of the coefficients is very similar to the coefficient for the interaction term in Model 3 of Table 3, which included respondent fixed effects.[22]

Models 3 through 6 are linear probability models with respondent fixed effects. Model 3 uses coarsened exact matching (CEM) to match white and black job seekers on observable characteristics.[23] The model matches job seekers on gender (two categories: men and women), education (four categories: less than high school, high school, some college, college or more), age (five categories: 18 to 24 years old, 25 to 34 years old, 35 to 44 years old, 45 to 55 years old, and 55 to 64 years old), and marital status (four categories: married, living with one's partner, never married, and a combined category for separated, widowed, or divorced).[24] Model 4 excludes job applications that were heard about through both formal and network-based channels. Model 5 excludes respondents who received four or more job offers over the survey period to ensure that outliers in terms of job offers are not driving the findings. Finally, Model 6 includes applications that received a job offer but that were not part of the prospective pool of applications. At each wave, after asking respondents whether previously listed applications resulted in job offers, we asked if they had received offers from any other employers and then we collected detailed information about the applications that led to those offers. These applications are not included in our primary analyses because there is the possibility they could bias our estimates insofar as they appear in our data *because* they resulted in a job offer. In Models 3 through 6, each interaction term between network-based search and being a black job seeker is negative and statistically significant. Together, the findings in Table 6 demonstrate that our results are highly consistent across these alternative specifications, providing additional support for the pattern that African American job seekers benefit less from network-based search than do white job seekers.

ALTERNATIVE EXPLANATIONS

We now explore a set of alternative explanations for our findings. We examine in detail any racial differences in the types of network ties respondents have access to, whether there are differences in the types of jobs to which job seekers apply by network-based search and race, and whether there are different returns to network mobilization for white and black job seekers. Results from the analyses in this section are presented in Tables S4 through S6 of the online supplement.

Different Types of Ties?

The evidence presented above does not support the *network access* argument. We find that black and white job seekers heard about job leads through network-based search methods at similar rates during the job search process. However, black and white job seekers may have access to different types of network ties—family, friends, acquaintances, or

Table 6. Robustness Checks for Differential Returns to Network-Based Job Search (Linear Probability Models)

	Random Effects (No Controls)	Random Effects (With Controls)	Using CEM: Gender, Age, Education, and Marital Status (Fixed Effects)	Excluding Formal and Network-Based Applications (Fixed Effects)	Excluding Respondents with Four or More Offers (Fixed Effects)	Including Additional Job Offers (Fixed Effects)
	(1)	(2)	(3)	(4)	(5)	(6)
Network Search	.0741***	.0671***	.0749***	.0655***	.0612***	.0879***
	(.00949)	(.00976)	(.0162)	(.0108)	(.00967)	(.0116)
Black Job Seeker	−.0256**	−.0110				
	(.00932)	(.00955)				
Network Search × Black Job Seeker	−.0362*	−.0371*	−.0489*	−.0429*	−.0474**	−.0531**
	(.0155)	(.0151)	(.0200)	(.0177)	(.0141)	(.0174)
Controls Included	no	yes	yes	yes	yes	yes
Constant	.0861***	.249***	.178***	.214***	.194***	.229***
	(.00531)	(.0654)	(.0356)	(.0202)	(.0198)	(.0224)
R-Squared	.0182	.0871	.0680	.0749	.0791	.1070
Number of Job Seekers	1,389	1,389	1,234	1,381	1,337	1,394
Number of Applications	13,643	13,643	12,245	13,079	12,818	14,035

Source: NLSJS.
Note: Clustered standard errors are in parentheses. Model 1 includes a control for "other" method used. Model 2 includes the full set of controls from the random-effects models in the main analysis. Models 3 through 6 include the full set of controls utilized in the fixed-effects models in the main analysis, except for Model 6, which excludes whether the job was below the respondent's skill level, because this question was not asked about the additional job offers. The indicator for being a black job seeker is not included in Models 3 through 6 because it is absorbed by the fixed effects.
*$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed tests).

co-workers and employers—with different frequencies. Thus, our aggregate measure of network-based job search may mask racial heterogeneity in the types of network search in which job seekers engage.

To examine this possibility, we created a four-category measure of network-based job search strategies that included the following categories: (1) friends, (2) family, (3) acquaintances, and (4) former co-workers and employers.[25] Then, we estimated a multinomial logistic regression model, where the four-category job-search strategy measure was the dependent variable ("friends" was the omitted category) and the key independent variable was whether the job seeker was black. We also included the full set of controls utilized in the random-effects models above. None of the coefficients for being black reach statistical significance ($p > .10$). Additionally, a post-estimation test indicates there is no overall difference in the utilization of different search methods for white and black job seekers ($p > .10$). Thus, even when we disaggregate the various types of network-based search, we still do not see evidence that black and white job seekers have differential access to networks during their job search.

Differences in Jobs Applied to with Network-Based versus Formal Applications?

One potential alternative explanation for our finding about the differential returns to network-based search for white and black job seekers is that the types of jobs workers hear about through network-based and formal channels are different, and these differences also vary by race. The existing literature on this topic provides somewhat conflicting evidence, but some scholarship suggests jobs generated through network ties can be a better match for job seekers relative to jobs found through formal channels (for a review, see Marsden and Gorman 2001). If this is more often true for white than for black job seekers, then job match—rather than network placement or network mobilization—may better account for racial differences in returns to network-based search.

If this alternative account is correct, we would expect network-based job search to produce better matches for job seekers, particularly for white job seekers. Thus, we explore differences in job fit, quality, and suitability along four dimensions: (1) occupational fit (whether the occupation to which job seekers applied was the same as their previous or current occupation), (2) skill congruence (whether job seekers perceived the job to which they applied to be at, rather than above or below, their skill level), (3) occupational earnings scores (a measure of earnings in each occupation), and (4) convenience (the geographic distance to the job to which they applied). If the alternative mechanism proposed here accounts for the racial differences in returns to network-based job search, we would expect to observe network-based methods—compared to formal methods—leading to applications with relatively lower rates of occupational fit, skill congruence, occupational earnings scores, and convenience for black job seekers compared to white job seekers.

We examined these four dependent variables utilizing models that include respondent-specific fixed effects. Our key independent variables were whether network-based search was used for a given application and an interaction between network-based search and being a black job seeker. The full set of controls were included in the models. In no model was the coefficient for network-based search or its interaction with being a black job seeker statistically significant ($p > .10$). Thus, we do not have evidence to support the alternative explanation that there are racial differences in the use of network-based versus formal search to apply for different types of jobs.

Are There Racial Differences in Returns to Network Mobilization?

A final alternative—or complementary—explanation we consider here involves a form of unmeasured racial discrimination by employers, which we examine by exploring

whether there are differential returns to network mobilization for white and black job seekers. In addition to less mobilization among black job seekers' networks—the pattern documented in our main analyses—it may also be the case that network mobilization is less effective for black job seekers (Silva 2018). If employers are less likely to be swayed by the recommendations of black employees or referrers, we may observe a smaller effect of mobilization for black job seekers (assuming racial homophily within social networks). However, this effect would be driven by employer discrimination rather than network behavior. We test this alternative hypothesis by examining potential racial differences in *returns* to network mobilization in producing job offers. Specifically, we tested for these differential returns to network mobilization by including an interaction term between being a black job seeker and having the network alter connect the job seeker with someone at the company or having one's network alter contact the employer on the job seeker's behalf in separate models predicting job offers, conditional on using network-based search. The coefficient for the interaction term in both models is not statistically significant ($p > .10$). Thus, the evidence indicates that, in our data, black and white job seekers are not rewarded differently when their networks mobilize.

DISCUSSION AND CONCLUSIONS

The intersection of race and social networks has been of central concern to sociologists and social scientists for quite some time. A combination of theoretical and methodological challenges, however, have limited the ability to make advances in understanding the ways social networks shape racial disparities in employment outcomes. In this article, we brought an integrative theoretical approach and new data to bear on these issues, examining the supply side of the job matching process. First, we distinguished between two potential pathways via which social networks may shape racial disparities in the labor market: *network access* and *network returns*. Second, we moved beyond the circular logic that has limited prior research on *network returns* by articulating two distinct mechanisms through which networks may differentially influence the outcomes of black and white job seekers: *network placement* and *network mobilization*.

Previously, these mechanisms have largely been examined with single case studies, qualitative data, or a focus on relatively homogenous populations to theoretically develop the mechanism without directly tying it to racial disparities (DiTomaso 2013; Royster 2003; Smith 2005). Thus, to date, the scope, generalizability, and explanatory power of these mechanisms for understanding supply-side processes of racial inequality has been limited. In the present study, by contrast, we were able to simultaneously empirically test these competing pathways and mechanisms utilizing original panel data from a large, national, probability-based sample of job seekers with fine-grained information about job seekers' application pools as well as the job offers individual job seekers receive. Our data provided us with increased generalizability over previous studies in this area, while enabling stronger traction on identifying the direct relationship between network-based search and job offers through use of a within-person analytic approach.

Our first key finding indicates that black and white job seekers receive job leads from their social networks at similar rates. Thus, our data provide evidence against the *network access* account of racial disadvantage in the job search process. It is possible that we do not detect racial disparities in *network access* because African American job seekers are aware of racial discrimination, and thus they attempt to utilize their networks to target employment opportunities where there may be less racial discrimination and improve their likelihood of obtaining a job offer. We encourage future research in this area. Second, using models that control for time-invariant individual-level unobserved heterogeneity, we demonstrated that network-based job search, compared to utilizing formal methods, results

in a higher probability of receiving a job offer for both black and white job seekers. However, these benefits are significantly smaller for black than for white job seekers. This set of findings provides compelling support for the *network returns* line of thought, indicating there is something different about white and black job seekers' networks that perpetuates racial inequality in employment opportunities.

Our analyses then probed the mechanisms underlying the weaker returns to network search for black job seekers. We found that, conditional on hearing about an opening through a network-based channel, black job seekers are less likely than white job seekers to (1) know someone at the companies to which they are submitting applications, and (2) have their network mobilize key resources on their behalf, specifically contact an employer on their behalf. These two mechanisms—*network placement* and *network mobilization*—assist in explaining approximately one-fifth of the black-white disparity in job offers among applications that are heard about through social network-based channels. This finding helps us understand why network-based search is less beneficial for black than for white job seekers. Together, our results advance our understanding of the connections between race, social networks, and labor market outcomes by providing evidence about how the within-person relationship between network-based job search and job offers varies by race. At the same time, our results identify two key mechanisms underlying the differential returns to network-based job search, pointing to the ways racial differences in alters' strategic locations and mobilizing behaviors are implicated in the perpetuation of racial inequality.

In addition to providing insights about how networks matter for racial inequality in the labor market, our analysis also sets up potential avenues for future scholarship. We focus on black-white disparities. Future research could expand on this line of scholarship by theoretically developing and empirically testing the ways social networks operate for other racial and ethnic groups, such as Latino and Asian workers—including attention to the role of citizenship and migration—during the job search process. Additionally, the empirical results identified here may vary with job seekers' geographic location (see McDonald et al. 2016). More densely populated areas or areas with more racial diversity may lead to variation in the link between network-based job search, race, and labor market outcomes. We include controls for geographic region, but a more explicit exploration of geographic heterogeneity in these relationships could provide new theoretical insights about how network processes operate.

While our data and analysis allow us to make unique advances in the literature on race, networks, and labor market processes, they have some limitations. First, we highlight network placement and network mobilization as two key mechanisms that may result in differential returns to network-based job search for African American compared to white job seekers. Although we conceptualize these as central to understanding race and networks, they are not the only pathways that may produce differential network effects by race. As Lin (2000) notes, weaker returns to network-based search for various groups could also be due to differences in the ways individuals mobilize their contacts or how employers respond to different types of network contacts. For example, racial homophily among social networks means black workers are more likely to have black social ties, whose voice and recommendations may be devalued by employers due to racial bias (Silva 2018; Stainback 2008). Our empirical test of this possibility indicates this pathway is not driving our findings, but future work would be well served to consider how characteristics of one's network alters—their race, gender, and social status—may shape their effectiveness in producing labor market benefits. It is also possible that network alters are less likely to mobilize resources for African American job seekers if they think the employer may discriminate by race. In other words, this hesitancy to mobilize resources may be about anticipatory discrimination from employers,

rather than the beliefs or attitudes of the network alters themselves (Abraham 2019). Our data do not enable us to examine why network alters mobilize resources less for African Americans in their networks, but continued investigation in this area is important.

Second, we note the possibility that the overall composition of the search methods one uses—the balance between formal and network-based search—may be shaped by one's social position. Highly socially connected individuals—people with many network ties—may submit relatively fewer applications through formal channels because they are likely to obtain an offer through their informal networks. Unfortunately, we do not have information about the overall size or structure of our respondents' social networks and therefore are not able to test for this possibility empirically. Third, our data include both individuals who are employed and unemployed at the time of their job search, but we are unable to directly distinguish between active and passive job search in our data. To the extent that people are often connected to job opportunities without engaging in active search (see Granovetter 1974; McDonald et al. 2009), these dynamics may further shape racial disparities in the effects of network-based search. And, individuals who select into actively searching for work may be different from those who do not, limiting the generalizability of our findings to those who are actively seeking employment. Finally, our analysis is limited to whether an application resulted in a job offer. We do not have information about earlier stages in the application process, such as whether the application resulted in an interview, an important early part of the employment process. Distinct network processes and mechanisms may be at play at different points in the job application process and these processes may differ by race, with important consequences for the processes that give rise to inequality (Barbulescu 2015). We encourage future scholarship to directly address this set of issues.

Together, our findings point to the subtle processes at play in the perpetuation of racial labor market stratification. The mechanisms we identify—*network placement* and *network mobilization*—appear race-neutral on their surface. However, our results suggest they play a key role in shaping racial disparities in employment outcomes. As Loury (2001) argues, the informal nature of networks of opportunity appears highly consequential for the perpetuation of racial inequality in the United States. Racial discrimination in hiring and other aspects of the employment process remains strong and persistent, but interventions that target these more subtle dynamics may also be important for reducing racial labor market inequalities.

Racial labor market disparities persist across nearly all stages of the employment process, with African Americans facing disadvantages compared to their white counterparts. In this article, we closely examined one process—network-based job search—that is implicated in perpetuating these racial disadvantages. Drawing on original and detailed panel data tracking respondents' application pools, we identified important pathways and mechanisms through which network-based job search disadvantages black job seekers relative to white job seekers, providing new insights about key drivers of racial labor market disparities. Ultimately, these findings shed important light on the ways racial inequalities are perpetuated and disadvantages in the labor market are reinforced.

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Notes

1. Applications reported in one wave that resulted in a job offer in a subsequent wave are linked over time.
2. We theorize weaker returns to network-based search for African American job seekers than for white job seekers, but it is also possible that network search will have stronger positive effects for African Americans because a referral may counter the mechanisms driving employer discrimination (see Fernandez and Greenberg 2013).
3. Lin (2000), whose seminal work we build on theoretically, discusses social capital "deficits" and "returns." We diverge from this language in two ways. First, we follow Obukhova and Lan (2013) in using the language of networks rather than social capital. Second, we use the language of "network access" rather than the language of "deficits." In line with Lin (2000), we conceptualize the potential challenges faced by African Americans with regard to networks as primarily functions of broader social and institutional processes. The language of "deficits" could potentially be misconstrued as placing the "deficit" on the job seeker, rather than on the broader social structure. Accordingly, we emphasize the issue of "access."
4. This line of thought is related to what some scholars call the "wrong networks" model (see Fernandez and Fernandez-Mateo 2006).
5. One could conceptualize network placement in multiple ways. For example, one could argue that network placement is one dimension of network access. Yet, as we note, we conceive of network placement as a key mechanism that may shape the utility of having heard about an opening through a network-based channel.
6. These data were collected as part of an original data collection effort by the authors to address issues related to job search and labor market inequality.
7. The uneven spacing of waves 8 and 9 was to allow for a longer-term follow-up with respondents and to expand the window of observation for our study.
8. Thus, individuals who reside in correctional facilities or nursing homes, for example, are not included in the target population.
9. By focusing on the "most recent" applications submitted, we aimed to capture a random draw of total job applications and to target applications about which respondents' memory was likely to be most accurate.
10. Respondents were also asked whether they had received a job offer from any employer we had not previously captured and, if so, to provide detailed information about the application process that led to that offer. These applications are excluded from our primary analyses because they may introduce bias due to the fact that they only show up in our data because they resulted in a job offer. However, the findings are consistent when we include these applications in our analysis.
11. Given the way the application-specific data were collected, it is possible respondents may have listed the same application more than once. Additionally, if a respondent listed an occupation or type of organization (e.g., grocery store) as the name of an employer for an application, they were not asked whether that application resulted in an offer in future waves. Our results are consistent when addressing these potential issues.
12. Respondents were able to select multiple search methods for each application. If a network-based and formal application method were selected, the application was coded as network-based search. Results are consistent when coding applications listed as both formal and network-based search as formal search, or when those applications are excluded from the analysis entirely. Black and white respondents are similarly likely to list an application as using both network-based and formal methods. Applications where the respondent only selected the "other, please specify" option are excluded from the analysis. If the "other" option was selected along with another method, the application is coded using the procedure outlined in the text and also coded as equal to "1" on a separate indicator variable that is included in the models where network-based search is not the dependent variable.
13. We do not control for whether the application was heard about from both formal and network-based sources in the models where network-based search is the dependent variable. Results are robust to excluding those applications from these analyses.
14. For time-varying or application-specific variables, observations with missing data are excluded from the analysis. For missing data on time-invariant characteristics of the respondent, we code the respondent as zero on continuous variables and then include in the model an indicator variable for whether the respondent was missing. For time-invariant categorical variables, we include a separate category for respondents missing on that variable. Only one respondent was missing on whether they were fired from their last job. This respondent is coded as 0 on that variable. Results are robust to excluding that respondent from the analysis. Our findings in Tables 2 through 5 are robust to including the logged number of applications submitted, rather than the number of applications submitted.
15. In the random-effects logit models, we note slight changes in the statistical significance levels for being a black job seeker in the fully controlled models where the dependent variable is contacting the employer on the job seeker's behalf. In these

models, *p*-values are slightly above the .05 threshold (see Table S2 in the online supplement).

16. In order for the *network access* pathway to drive racial disparities in employment outcomes, there would need to be racial differences in network-based search *and* network-based search would need to result in a higher probability of job offers than formal search. Our data demonstrate that the first component of this link—racial differences in network-based search—does not hold, indicating that the *network access* pathway is not driving racial disparities in employment outcomes.
17. As we noted, there are challenges with interpreting the statistical significance of interaction terms in within-group logit models, such as fixed-effects logit models. However, when we estimate fixed-effects logit models for Model 3 in Table 3 and Models 3 through 6 in Table 6, the interaction term between being a black job seeker and network-based search is negative and has a *p*-value below .10 in all instances.
18. Although not the focus of this article, we also examined whether racial differences in returns to network search were moderated by the gender of the job seeker. We do not find evidence of gender-differentiated racial disparities.
19. This number is reached by dividing the difference between the black job seeker coefficients in Models 1 and 5 by the coefficient in Model 1.
20. We utilize linear probability models with clustered standard errors, rather than random-effects models, due to challenges implementing seemingly unrelated regression with random effects in Stata. Importantly, the point estimates and standard errors in the models without random effects are very similar to those in the models with random effects. See Table S3 in the online supplement for the regression coefficients from the models without random effects.
21. As with the seemingly unrelated regression, these mediation tests do not include respondent random effects. To enable the mediation analysis to run, we limited the prior occupation and occupation applied to indicator variables to three broad categories: managerial/professional, service, and manual. These models also exclude the two respondents who were missing on whether they owned a car, because the mediation analysis could not be performed when including these respondents.
22. Predicted probabilities from Model 1 in Table 6 are presented in Figure S1 in the online supplement.
23. We use CEM to more directly compare similarly situated white and black job seekers. The CEM procedure matches respondents from "treatment" and "control" groups—in our case, rather than treatment and control, we match white and black respondents—exactly on key covariates of interest. CEM then generates a set of weights that the researcher utilizes for subsequent analyses (see Iacus, King, and Porro 2011).
24. Alternative matching algorithms produce similar results in terms of sign and magnitude, although statistical significance is reduced in some cases, potentially due to a reduction in sample size.
25. Applications that utilized multiple types of network-based search or included "other" methods are excluded from this analysis.

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